# Final report

OWMC
**Ontario Waste Management Corporation**

A provincial crown corporation.

ier
Institute of Environmental Research Inc.

# SITE SELECTION PROCESS
# PHASE 4A:
# SELECTION OF A PREFERRED SITE(S)

## SOCIAL ANALYSIS

Prepared by:

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November, 1985

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November 18, 1985

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ATTN: Mr. J. G. Micak
Manager, Environmental Projects

Dear Dr. Mitchell:

RE: Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Social Analysis

We are pleased to submit our report for the above-noted study.

This report documents the approach and factors utilized in carrying out the social analysis which compared the remaining siting options and contributed to the selection of the preferred siting option.

The accompanying Detailed Appendix - Volume 1 provides the factor sheets and background data used in the social analysis. Mapped data relevant to the social analysis are contained in Section G of Appendix - Volume 1 and in the composite maps in the M.M. Dillon Ltd., Site Selection Report.

Sincerely yours,

Peter Homenuck

Peter Homenuck, MCIP
Senior Partner

PH:vp
Enc.

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# *EXECUTIVE SUMMARY*

## *PURPOSE OF THE REPORT*

*Social impacts are alterations that occur in people's living conditions as a result of the development and implementation of a new policy, program or project. Although the nature of such changes may be positive or negative, real or perceived, they are experienced by those affected as significant alterations in the existing social milieu. Social impact analysis attempts to predict the changes that will or will likely occur as a result of project implementation.*

*The need to consider the potential social impacts of siting a waste management facility is recognized by the Ontario Waste Management Corporation (OWMC) and is an integral part of the site selection process. During this phase of the process, the social consultants were engaged in assessing the probable impacts of facility development on each of the candidate sites brought forward from Phase 3B. This report documents the social impact analysis which contributed to the selection of a preferred site from among the alternatives.*

## *SCOPE AND METHOD*

*The following components of facility development were individually assessed in terms of their potential social impacts.*

- *Refinement of Site Boundaries*
- *Rail Access Options*
- *Access Route Options*
- *Location of the Physical/Chemical Treatment Plant for Partially Integrated Siting Options*
- *Siting Options*

## REFINEMENT OF SITE BOUNDARIES

Three of the candidate sites - PI1N, LF3C and LF1E[1] - comprised area in excess of that required for facility development. It was necessary, therefore, to refine the site boundaries prior to comparing siting options.

The site boundaries were refined by the site selection team through a constraint mapping exercise. However, the factors and indicators used in the social analysis are not well suited for constraint mapping. Hence, prior to the social analysis for site boundary refinement, other members of the site selection team identified major constraints and portions of the site were excluded. The remaining portions were divided into parcels to facilitate comparisons from a social perspective.

Two parcel options were compared for each of PI1N, LF3C and LF1E. The factors and indicators considered in the comparison were:

- displacement of residents - the number of residents displaced, their characteristics, and attachment to place
- displacement of community and recreation features - the number and characteristics of community and recreation features displaced.

Where the above indicators failed to identify differences among potential options, the following factors and indicators entered the comparison:

- disruption of day-to-day activities and/or the use and enjoyment of property - the number of residents adjacent to the parcel option whose property use/enjoyment might be disrupted by facility operations
- disruption of operations - the number of community and recreation features adjacent to the options and the characteristics of the use and users of these features.

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1. No site boundary refinements were required for LF1E as an integrated site. Refined site boundaries were investigated for LF1E as a partially integrated site.

## RAIL ACCESS OPTIONS

A number of preliminary rail access options underwent constraint mapping at a scale of 1:10,000 in order to identify alternative rail access options. The factors and indicators applied at this level of comparison were:

- estimated population - dwelling counts and average household size
- community and recreation features - number and type

The alternative rail access options underwent a more detailed comparative evaluation, at a scale of 1:10,000, to arrive at a recommended preferred option for each site. The factors and indicators applied at this level of comparison were:

- Displacement - number of residents potentially displaced due to construction
- Disruption of day-to-day activities and/or the use and enjoyment of property - number of residents within 170 metres of the rail options who might be affected by increased noise due to rail movements; number of residents within 250 metres of the rail options potentially disrupted due to evacuation in the event of an accident
- Displacement - number of community and recreation features potentially displaced due to construction
- Disruption of operations - number of community and recreation features within 170 metres of the rail options whose operations are potentially affected by increased noise; number of community and recreation features within 250 metres of the rail options potentially disrupted due to evacuation in the event of an accident

In the analysis of potential impacts, high priority was assigned to the number of residents potentially displaced; and moderately high priority was assigned to the number of residents within the 170 metre impact zone. The number of residents within the 250 metre impact zone was given moderate priority. Moderate priority was given to the number of community and recreation features *potentially displaced. Moderately low priority was assigned to the number of community and recreation features within the 170 metre impact zone and low priority was given to the number of community and recreation features within the 250 metre impact zone.*

## *ACCESS ROUTE OPTIONS*

*The scope of Phase 3B analysis resulted in the preliminary identification of a preferred access route to each of the candidate sites. The need to review certain Phase 3 options and the identification of several additional access route options after Phase 3B, made it necessary to again consider access routes and select preferred routes prior to comparing the siting options.*

*The access route options were reviewed in two stages. All options brought forward from Phase 3B for re-examination and all additional options identified by the transportation consultant, M.M. Dillon Ltd., underwent a preliminary evaluation. In cases where the analysis failed to identify a preferred route, the remaining options underwent comparative evaluation.*

*The following Phase 3B factors and indicators were applied for the preliminary evaluation of the access route options:*

- *Community and recreation features - number and type of community and recreation features*
- *Estimated population - dwelling counts; average household size*
- *Population concentrations - number and size of population concentrations*

*In the preliminary analysis priority was given to those options with the fewest residents, the smallest population concentrations, and the fewest community and recreation features. When the overall ranking of two options* appeared to be similar, the population-related factors were given preference in the ranking over the number of community and recreation features.

The following factors and indicators were applied for the detailed evaluation of the remaining access route options:

- Displacement of residents - number of residents
- Displacement of community and recreation features - number and characteristics of community and recreation features
- Disruption of day-to-day activities and/or the use and enjoyment of property - number of residents
- Disruption of operations of community and recreation features - number and characteristics of community and recreation features

In the analysis of potential impacts, five general impact categories were developed to assist in ranking the access route options. Each impact category established a range comprising the number of residents and the number of community and recreation features located adjacent to the access route. Once the access route options had been ranked using these impact categories, they were reviewed in terms of the number of residents and features within the 800 metre study area, and the ranking was adjusted accordingly. In both stages of the assessment, community features which were used frequently and served populations such as children or senior citizens, were given the most weight in the ranking.

## LOCATION OF THE PHYSICAL/CHEMICAL TREATMENT PLANT FOR PARTIALLY INTEGRATED SITING OPTIONS

On each of the three partially integrated siting options - PI13N/LF4N, PI1N/LF4N and PI27E/LF1E[1] - there was a choice between locating the physical /chemical treatment plant with the incinerator or with the engineered landfill. The distribution of the facility components between the two sites affects the extent of potential impacts off-site and along the access routes. It was necessary, therefore, to examine and compare these impacts for each of the two possible facility combinations.

The factors and indicators applied to compare the Case 2 option (physical/chemical treatment plant and incinerator on the PI site, and landfill on the LF site) to the Case 3 option (incinerator on the PI site, and the physical/chemical treatment plant and landfill on the LF site) were:

- Disruption of day-to-day activities and/or the use and enjoyment of property - the number of residents within the daytime and nighttime noise impact zones in each site vicinity; the number of residents within the noise impact zone in each access route vicinity; an impact index for residents adjacent to, and within the 800 metre study area of each access route.
- Disruption of operations - an impact index for community and recreation features adjacent to, and within the 800 metre study area of each access route.

In the analysis of potential impacts, the potential disruption of day-to-day activities and/or the use and enjoyment of property was considered more significant than the potential disruption of operations of community and recreation features. High priority was assigned to the number of residents within the noise impact zones. Moderately high priority was assigned to the impact index for the residents adjacent to the access route and moderate priority was assigned to the impact index for residents within the access route 800 metre study area. Moderately low priority was assigned to the impact index for features adjacent to the access route and low priority for features within the access route 800 metre study area.

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[1] Site LF2N was dropped from consideration because it failed to provide natural containment. Partially integrated siting options PI1N/LF2N and PI13N/LF2N, therefore, were also dropped from consideration. Refer to M.M. Dillon Ltd., Site Selection Process, Phase 4A: Interim Site Selection Report, Candidate Site LF2N, 1985, for details of this decision.

## SITING OPTIONS

Once the site boundaries had been refined, the location of the physical/chemical treatment plant established, and the preferred access route options determined, the following siting options underwent a process of comparative evaluation: PI13N/LF4N, PI1N/LF4N, PI27E/LF1E, LF1E, LF3C, and LF9C.

In the subsequent analysis, potential impacts were considered within three factor groupings:

- Impacts on Residents
- Impacts on Community and Recreation Features
- Impacts on Community and Region.

The analyses of impacts on residents, and impacts on community and recreation features were applied to the following study areas:

- site
- adjacent to the site
- site vicinity (roughly 2km around the site, excluding the adjacent study area
- adjacent to access route
- access route vicinity (800m along both sides of the route, excluding the adjacent study area)

The study areas applicable to impacts on community and region included:

- site
- adjacent to site
- site vicinity (as above, and from 2-5km around the site)
- local municipality
- areas having a view of the site.

*Factor groupings were refined into factors, indicators and sub-indicators developed to reflect types of potential impacts by study area. Within the factor grouping, Impacts on Residents, the factors are:*

- *displacement of residents on-site*
- *disruption of day-to-day activities and/or the use and enjoyment of property - adjacent to the site; in the site vicinity; adjacent to the access route; in the access route vicinity*

*Within the factor grouping, Impacts on Community and Recreation Features, the factors are:*

- *displacement of features on-site*
- *disruption of operations of community and recreation features - adjacent to the site; in the site vicinity; adjacent to the access route; in the access route vicinity*

*Within the factor grouping, Impacts on Community and Region, the factors are:*

- *social stability*
- *social cohesion*
- *community character*

*Each factor consisted of two or more indicators used to measure the potential impacts on each of the siting options. In some instances, indicators comprised only one sub-indicator. In other cases, several sub-indicators were aggregated to produce one indicator.*

*Potential impacts were predicted, by factor for each siting option, using a numerically weighted analysis supplemented by a qualitative input as appropriate. The weighted analysis assigned points to each of the factors based on the priority given to impacts by study area. Disruption of residents adjacent to the site was assigned the highest weight of 1,500 points. Displacement of residents and disruption of residents in the site vicinity were assigned the second highest weight of 1,200 points. Disruption of residents adjacent to the access route, social stability and community* *character were each assigned 800 points. Disruption of residents in the access route vicinity was given 600 points, social cohesion was given 400 points, and disruption of feature operations adjacent to the site was assigned 300 points. Displacement of features and disruption of feature operations in the site vicinity were each assigned 200 points. Disruption of feature operations adjacent to the access route was assigned 150 points. The lowest priority (100 points) was assigned to the disruption of feature operations in the access route vicinity.*

*The application of the numerical weighting to the factors comprised the following steps:*

- *With each factor, total points were distributed across all indicators and/or sub-indicators according to the importance or certainty associated with each.*
- *Each indicator or sub-indicator was calculated as a proportion of one by dividing all values for the indicator or sub-indicator by its highest value. The largest value, therefore, became 1.0 and all remaining values less than 1.0.*
- *Each proportion was multiplied by the points that had been assigned to the indicator or sub-indicator to arrive at an impact value for each siting option by indicator or sub-indicator. Each resulting value was divided by 1000 to maintain consistency with 1.0 being the maximum value possible.*
- *Impact values for indicators or sub-indicators were added to produce the relative impact for each siting option by factor.*
- *Impact values for factors were added to produce the overall ranking of the siting options.*

*In some instances, sensitivity tests were undertaken to determine if modified data inputs or weights might alter the ranking of siting options. In cases where such sensitivity analyses were undertaken, they are discussed in the body of the report. None of them resulted in major ranking adjustments.*

As a complement to the numerical analysis, some impacts are considered in a qualitative sense so some of the less tangible and non-quantifiable dimensions of impact are given sufficient consideration. Because comparable and measurable data are not available for some impacts, professional judgement is relied upon for the modifications in the analysis.

## PREMISES AND POSTULATES

### PREMISES

The following information, as provided by other study team consultants, or agreed upon by the site selection team, comprised underlying assumptions in the social analysis:

- minimal odour or lighting impacts associated with facility operations would occur off-site
- dust and particle emission impacts would be essentially contained within the two kilometre study area
- any off-site air emissions associated with facility operations would meet the Ministry of Environment's air quality standards
- the physical/chemical treatment plant would operate five days a week and the incinerator would operate seven days a week; both would operate twenty-four hours a day. The landfill, on a separate site, would operate Monday to Friday, during daytime hours; the landfill in combination with the physical/chemical treatment plant, could operate twenty-four hours a day, five days a week.
- rail movements to the facility would occur at any time during a twenty-four hour, seven day schedule
- truck movements to the facility would occur Monday to Friday, during daytime hours
- any noise impacts beyond provincial guidelines associated with facility and trucking operations would be confined to designated noise impact zones around the site and along the access route
- total solidification will be the technological process used to handle the residue of materials from the incinerator and physical/chemical treatment plant prior to placement in the landfill.

## POSTULATES

The following assumptions were those that were made by the social consultant in the development and application of the impact assessment:

- residents and community and recreation features located beyond the boundaries of a site would not be displaced in the event of facility development
- off-site impacts associated with facility operations would dissipate over distance
- the extent of in-migration of facility employees and their families to the local municipality would not be significant enough to create positive or negative impacts during both construction and operation phases and therefore does not affect the ranking of siting options
- where commitments to the application of mitigation measures were made, they were incorporated in the analysis
- the inclusion of the adjacent and vicinity study areas, in addition to designated impact zones, would ensure the consideration of those residents and community and recreation features most likely affected by facility development
- certain population groups would be affected to a greater extent by displacement or disruption than the general population, and the populations potentially most vulnerable would depend on the nature of the impact being considered.

## STATUS OF DATA

Data used during Phase 4A were gathered through:

1) field investigations of the candidate sites, access routes and study areas
2) a survey of residents on-site, adjacent to the site, in the site vicinity and adjacent to the access routes
3) contacts with public and private agencies or representatives responsible for the operation of community and recreation features
4) secondary sources

Since the residents contacted did not all respond to the survey, estimates for primary data were sometimes required.

Similarly, the agencies or representatives contacted did not all respond to requests for information on community and recreation features. In other instances, the information requested was not available, either in its entirety or in the form required for comparison. In a limited number of cases, the agency or representative could not be reached.

As is the case with all data, the above information was a reflection of conditions existing at the time the study was undertaken and so does not account for any subsequent changes.

Despite the above-noted limitations, the data were adequate for their application in the social analysis.

## FINDINGS

The social analysis produced the following findings for submission to the site selection team:

- Two parcel options were compared for each of PI1N, LF3C and LF1E. Based on the social analysis, the following parcel options were preferred:
  PI1N - Parcel Option 1; the northeast corner of the original site acquisition boundary
  LF3C - Parcel Option 2; the original site acquisition boundary with the northeast corner of the site and the northwest section of the site north of Beaver Creek floodplain excluded
  LF1E - no preference was identified for either Parcel Option 1 or 2
  The parcel options are identified on Maps 4.1 to 4.3 in Chapter 4.

- Detailed comparative evaluation of the rail access options revealed two preferred alternatives to each of PI1N, LF3C, LF9C, and LF1E and three preferred alternatives to LF4N. For PI27E, the existing configuration of the rail routes, on and around the site, precludes the need for off-site construction of a spur line. The rail access options are shown on Maps 5.1 to 5.6 in Chapter 5.

- Detailed comparative evaluation of the access route options revealed that two options to PI27E would experience very little impact. One option to LF3C would be moderately affected while the other options would experience little impact (these "options" for LF3C represent only sections of the access route options). One option to PI1N/LF4N would be moderately impacted while the other option would have little impact. The four options to LF1E would experience little impact. Two routes linking PI27E to LF1E would experience very little impact while the two remaining routes would experience little impact. The access route options are identified on Maps 6.1 to 6.12 in Chapter 6.

- Detailed comparative evaluation of the location of the physical/chemical treatment plant revealed that the Case 3 facility combination (i.e., the physical chemical treatment plant and landfill together on a LF site and incinerator on a PI site) was preferred for the partially integrated siting options of PI13N/LF4N, PI1N/LF4N and PI27E/LF1E.

- Detailed comparative evaluation of the siting options revealed the following overall ranking from potentially most to potentially least impacted: LF3C, PI13N/LF4N, PI1N/LF4N, LF9C, PI27E/LF1E, LF1E.

- The site option ranking, with the qualitative inputs considered, is the same as achieved by the numerical analysis, but the LF3C and LF9C options become less attractive and PI27E/LF1E and LF1E are relatively more preferred.

- Detailed information is not available concerning the extent of nuisance impacts associated with the construction of the OWMC facility. It is expected generally that those siting options with more residents and community and recreation features near the sites and access routes would experience greater disruption than those with fewer residents and features. Impacts arising from an influx of a temporary workforce were not considered to be significant due to the location of the sites and the mobility of construction workers in Southern Ontario. Construction impacts did not contribute to the detailed comparative evaluation of the siting options.

- Mitigation of impacts through the provision of rail access for additives and reagents found that impacts would generally be related to proximity to existing rail lines. As a result, existing rail access at PI27E leads to PI27E/LF1E being the more preferred site with LF1E and LF3C offering considerable opportunity with little impact anticipated. The Milton options, PI13N/LF4N, PI1N/LF4N and LF9C would experience relatively greater impacts.

- Mitigation through partial solidification, and in particular the effluent evaporation options, would not alter or affect the ranking of the sites.

- The basic acceptability analysis determined that all of the six siting options were acceptable from a social perspective, assuming appropriate mitigative measures.

- *A sensitivity analysis of site boundary modification for LF1E showed that the LF1E integrated siting option would still remain as the least impacted option. A similar analysis for LF3C found that the site would become the second most impacted, rather than the most impacted, siting option.*
- *Mitigation of impacts on adjacent residents through a property value protection plan would alter the overall ranking of the siting options to the following, from potentially most impacted to potentially least impacted: LF3C, PI13N/LF4N, LF9C, PI1N/LF4N, PI27E/LF1E, LF1E.*

## *CONCLUSIONS*

*The social analysis produced a comparison of relative social impacts of facility development by siting option. This relative comparison identifies the following order of preference among the siting options.*

- *LF1E*
- *PI27E/LF1E*
- *LF9C*
- *PI1N/LF4N*
- *PI13N/LF4N*
- *LF3C*

*The actual magnitude of some impacts cannot be predicted with certainty since some will be largely dependent on decisions of residents, public and private organizations, local governments, general social and economic trends and deliberate policy initiatives on the part of OWMC.*

# PART 1

## INTRODUCTION, FACTOR IDENTIFICATION AND DATA COLLECTION

# CHAPTER 1

# SOCIAL ANALYSIS OF SITING OPTIONS

## 1.1 INTRODUCTION

In 1984 the Ontario Waste Management Corporation (OWMC) announced eight candidate sites for a hazardous industrial waste management facility. The purpose of this study is to investigate and compare the social impacts that will or might result from the siting of the OWMC facility on each of the candidate sites. The study focuses on the relative differences among sites. Its purpose is to recommend a preferred site from the perspective of potential social impacts.

Social impacts are alterations that occur in people's living conditions as a result of the development and implementation of a new policy, program or project and that are experienced by these people as significant events. The facility proposed by OWMC will treat and dispose of hazardous liquid industrial wastes. The development of a facility of such a nature and size will undoubtedly result in changes in the social environment.

The objective of a social analysis is to assist decision-making by determining the implications of changes that are direct or indirect consequences of a proposed policy, program or project.

The specific objectives of this study are:

1) to determine the significance of the expected changes in people's way of life and living conditions if the proposed OWMC facility is constructed, including whether there are any impacts significant enough to warrant not siting the facility;
2) to determine which of the potential candidate siting options is likely to be the least impacted (i.e., to determine the relative ranking of the candidate siting options);
3) to clarify decision trade-offs amongst the siting options and identify measures necessary to mitigate impacts.

The process of social impact analysis involves describing the conditions that exist in the social environment before the project, and forecasting the implications that would be expected as a result of the project.

By their very nature, social systems are constantly changing. The task in social impact analysis is to identify potential changes that can be attributed to a proposed project and to assess the significance of these changes - the deprivations or benefits to the people involved - so that the social implications of the proposed project can be taken into account in determining public policy or designing impact management strategies.

Social impact analysis then is a two-stage systematic analysis. In the first stage the existing social environment is described and known and expected effects of a proposed development are identified. In the second stage, the effects are evaluated to describe their implications for the individuals living around the proposed development and in the broader community, as well as the implications for community and recreation features and the social environment of the community as a whole.

## 1.2 TYPES OF IMPACTS

In a review of the literature dealing with social and economic impacts of nuclear waste management facilities,[1] a distinction is made between standard and special impacts that is relevant to our assessment of the OWMC facility.

Standard impacts refer to the demographic, economic, social and political impacts imposed by any large construction project on surrounding communities. These standard impacts are related to the influx of a construction and permanent workforce and the nuisances and displacement associated with the development of the facility. Standard impacts have been the focus of most social impact analyses in the past and a variety of methods have been developed to predict these impacts.

Special impacts are largely subjective in nature and relate to the perceptions and attitudes that community residents have concerning waste management facilities. While subjective in nature, special impacts are no less significant. However, as is noted in the literature review, "all of the existing methodologies and models for predicting and measuring social impacts deal only with standard impacts (and not even with all of those). None of the methodologies or models attempt to cover any of the special impacts...[1] The "special social impacts...are not well understood, are not easily predictable, and can be extremely difficult to manage or prevent".[2]

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[1] Christopher Cluett et al., Social and Economic Aspects of Nuclear Waste Management Activities: Impacts of Analytic Approaches. (Seattle, Washington: Battelle Human Affairs Research Centers, 1979).

The social impact analysis for the OWMC project attempts to describe changes in relevant social characteristics of the community in response to the siting of the OWMC facility. As is apparent from the factors and indicators adopted for this study, some of the changes are readily quantifiable and can be predicted with certainty. The impacts of displacing residents or community and recreation features for site development are examples of these types of impacts. These might be viewed as standard impacts.

There are other changes in the social environment, however, that are more difficult to measure and cannot be predicted with the same certainty. These are changes that are rooted in the individual's behavioural and attitudinal response to the siting of the facility. In some respects, impacts on social stability, social cohesion or community character are examples of these types of changes and might be viewed as special impacts.

As noted above, there are no well developed methods to predict special impacts. Rather, they must be predicted on the basis of existing conditions, available research and case studies which frequently are not directly comparable, and ultimately, professional judgement must be used. These limitations suggest that while a comparison of relative impacts at alternative sites can be undertaken with some certainty, much less confidence can be

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1. Ibid., p.118
2. Ibid., p.124

attached to predictions of the absolute magnitude of these impacts. The scope of the Phase 4A analysis, however, was concerned primarily with relative impacts among the siting options.

In summary, the social impact analysis for the OWMC facility deals with a number of special impacts that may be unique to hazardous waste management facilities and are not customarily dealt with in social impact assessments. The magnitude of these special impacts will depend on behavioural and attitudinal responses that cannot be predicted in advance with confidence. An attempt can be made to describe how the social characteristics of a community may be impacted by the OWMC facility. It is also possible to make reasonable judgements based on existing conditions of the relative magnitude of social impacts in different communities. It must be recognized, however, that for the special impacts, the social impact analysis cannot and should not be seen as an actual forecast of future social conditions. It is for this reason that the social impacts of the OWMC facility siting must be monitored on an ongoing basis and compensation and mitigation mechanisms must be in place to respond to impacts that materialize. This issue is discussed further in Chapter 10.

## 1.3 IMPACT AREA

The geographic area impacted by a project will depend on the nature of the project and may range from a local neighbourhood to an entire region. In the case of hazardous waste facilities, public concerns about safety and security problems may extend far beyond the local area to encompass a wider region.

In the social analysis of the proposed OWMC facility, several different areas are used for data gathering and analysis to reflect the range of areas over which impacts might be experienced.

A full discussion of the study areas is found in Chapter 9.

## 1.4 AREAS OF SOCIAL ANALYSIS

The following broad areas of social analysis are examined in this report:

1. Displacement of residents from the sites.
2. Disruption and/or interference with the day-to-day activities of the residents around the sites and along the access routes.
3. Displacement of community and recreation features from the sites.
4. Disruption and/or interference with operations of community and recreation features around the sites and along the access routes.
5. Changes to the social characteristics of the community and the overall character of the community around the sites.

The social factors used in the study reflect the goals established by OWMC for the site selection process. The goals, in order of priority, are:

1. minimize risk to human health
2. minimize environmental impacts
3. minimize financial costs to OWMC

The social factors are directly related to OWMC's goal to minimize environmental impacts.

These areas of social analysis have been further categorized into more precisely stated factors, indicators and sub-indicators to permit systematic and comparative analysis amongst the siting options. To the extent that descriptive and qualitative data best describe a factor or indicator, they have been incorporated to modify and/or complement the more quantitative comparative data.

In the case where the information generated by the anaysis does not permit a comparison but does contribute to an understanding of the potential effect of the OWMC siting on a community, this information has been made available to OWMC for consideration in their mitigation and compensation policies. Examples of such information includes public concerns regarding health, property values and truck traffic.

A detailed discussion of the identification and development of the factors and indicators is found in Chapter 2.

## 1.5 SOCIAL ANALYSIS AND THE OWMC SITE SELECTION PROCESS

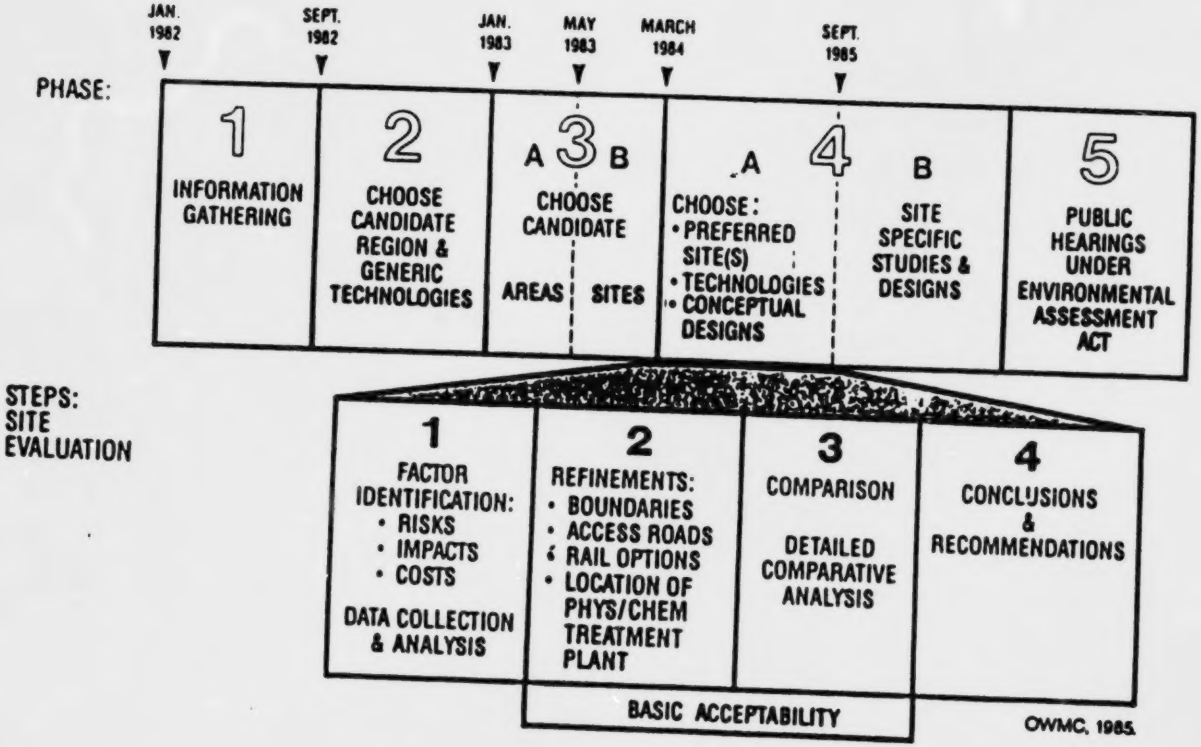
The OWMC site selection process is being undertaken in five phases, as illustrated in Figure 1.1. The current phase, Phase 4, is divided into two stages: Phase 4A, the selection of a preferred site(s); and Phase 4B, the detailed analysis of the preferred site(s). Phase 4A involved a four step process (see Figure 1.1):

1) Factor Identification and Data Collection

Factors were identified by the consultants on the site selection team to evaluate the potential risks, impacts and costs among the sites. Information was obtained from agencies and ministries, surveys and secondary sources to assist in the analysis.

*FIGURE 1.1*

FACILITIES DEVELOPMENT PROCESS


PHASE:
JAN. 1982
SEPT. 1982
JAN. 1983
MAY 1983
MARCH 1984
SEPT. 1985
1
INFORMATION GATHERING
2
CHOOSE CANDIDATE REGION & GENERIC TECHNOLOGIES
A 3 B
CHOOSE CANDIDATE
AREAS
SITES
A 4
CHOOSE:
• PREFERRED SITE(S)
• TECHNOLOGIES
• CONCEPTUAL DESIGNS
B
SITE SPECIFIC STUDIES & DESIGNS
5
PUBLIC HEARINGS UNDER ENVIRONMENTAL ASSESSMENT ACT
STEPS: SITE EVALUATION
1
FACTOR IDENTIFICATION:
• RISKS
• IMPACTS
• COSTS
DATA COLLECTION & ANALYSIS
2
REFINEMENTS:
• BOUNDARIES
• ACCESS ROADS
• RAIL OPTIONS
• LOCATION OF PHYS/CHEM TREATMENT PLANT
3
COMPARISON
DETAILED COMPARATIVE ANALYSIS
4
CONCLUSIONS & RECOMMENDATIONS
BASIC ACCEPTABILITY

OWMC, 1985.

2) Refinement of the Siting Options:

The following refinements were made to the siting options before they were compared to select a preferred option:

- Site boundaries were refined for sites PI1N, LF3C and LF1E. The acquisition boundaries for these sites, as identified in Phase 3B, were larger than that required for facilities development.
- Rail access options to link the candidate sites to main rail lines were identified and compared.
- In cases where a preferred access route was not identified in Phase 3B or additional access route options were identified subsquent to Phase 3B, the access route options were compared to select a preferred option. The characteristics of the preferred access route was then a consideration in the evaluation of the siting options.
- The preferred location of the physical/chemical treatment plant on the landfill or incinerator sites was determined for the partially integrated siting options of PI13N/LF4N, PI1N/LF4N and PI27E/LF1E.

3) Comparison of the Siting Options:

When the refinements, as outlined in step 2 above, were complete, the factors were reviewed and refined and in some cases screened from the analysis. The factors were then aggregated and the siting options compared.

4) Conclusions and Recommendations:

Finally, the major issues and trade-offs were reviewed among the siting options, the ranking of the siting options finalized and the preferred site was selected.

Figure 1.2 provides the relationship of the other Phase 4A studies to the social analysis. During Phase 4A, data were exchanged among consultants on the site selection team. As noted in Figure 1.2, data were collected jointly by IER and other consultants.

FIGURE 1.2
RELATIONSHIP OF THE SOCIAL STUDY TO OTHER 4A STUDIES

| Study | Consultant | Relationship to Social Study |
|---|---|---|
| Agricultural Impacts | Ecologistics Ltd. | • Cooperative administration of site, vicinity and access route surveys<br>• Joint finalization of land ownership data for site and vicinity<br>• IER provided characteristics of farm households |
| Economic Impacts | Clayton Research Associates Limited | • Sub-consultant to IER<br>• Clayton Research provided data on the projected number of employees and their families who would move to the regional and local municipality<br>• IER identified some small businesses operating out of private homes noted during the walk and talk survey |
| Transportation | M.M. Dillon Ltd. | • Dillon provided calculations of access route impact indices<br>• Dillon provided site and access route noise contours<br>• Dillon provided the extent and location of road widenings along access routes<br>• IER provided the population concentrations and the estimated number of residents and features along the access routes<br>• IER provided the number of school buses on access routes<br>• IER provided the number of sensitive community and recreation features along the access routes |
| Hydrogeologic Analysis | Gartner Lee Associates Ltd. (GLAL) | • IER collected data for GLAL through the walk and talk survey |
| Air Dispersion of Pollutant Emissions | Ontario Research Foundation (ORF) | • ORF provided data on air emissions<br>• IER provided the population and number of sensitive features within the air dispersion zones |

FIGURE 1.2
RELATIONSHIP OF THE SOCIAL STUDY TO OTHER 4A STUDIES

| Study | Consultant | Relationship to Social Study |
|---|---|---|
| Analysis of Official Plans/ Land Use | Leon Kentridge Associates Ltd. (LKA) | • LKA provided the number and location of residential dwellings on-site, in the 2km study area, and along the access routes and rail access options<br>• LKA provided documentation of existing land use and future land use designations. |
| Engineering | Monenco Limited | • Monenco provided inputs regarding facility characteristics |
| Site Selection | M.M. Dillon Ltd. | • Dillon provided overall direction and coordination of the site selection process |
| Generic Risk Assessment | Environ | • IER provided the number of sensitive features within 5km of the candidate sites |
| Tourism | Laventhol & Horwath | • Sub-consultant to IER<br>• Laventhol & Horwath provided data on tourism-related features |
| Visual Impacts | EDA Collaborative Inc. | • Sub-consultant to IER<br>• IER provided the estimated population within 2km of the candidate sites |

FIGURE 1.2
RELATIONSHIP OF THE SOCIAL STUDY TO OTHER 4A STUDIES

| Study | Consultant | Relationship to Social Study |
|---|---|---|
| Heritage Assessment | Historica Research Limited | • Sub-consultant to IER<br>• IER provided Historica Research Limited with heritage studies completed for Phase 3B<br>• IER provided possible historic buildings identified by field staff |
| Tourism | Jack B. Ellis & Associates | • Sub-consultant to IER<br>• Jack B. Ellis and Associates provided case study data on tourism impacts |

Throughout this report, data inputs provided to IER by the other consultants are noted where applicable.

IER's responsibility in Phase 4A encompassed all socio-economic considerations. Sub-consultants to IER provided analysis of specific issues within the socio-economic considerations. The sub-consultants and their areas of responsibility are noted below:

| | |
|---|---|
| Clayton Research Associates Ltd. | • Municipal Finance<br>• Economic Base |
| Laventhol and Horwath | • Tourism Impact |
| Jack Ellis & Associates | • Tourism Case Studies |
| EDA Collaborative Inc. | • Visual Impact |
| Historica Research Ltd. | • Heritage Assessment |

The results of the assessments of Historica Research Ltd. and EDA Collaborative Inc. have been incorporated into the social analysis contained in this report. The heritage assessment is documented in:

> Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 2, Heritage Assessment, 1985.

The visual impact analysis is provided in:

> Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 3, Visual Impact Assessment, 1985.

Laventhol and Horwath's assessment of potential tourism impact and Ellis' case study findings have been used in part in the social analysis contained in this report (the tourism assessment was applied in the assessment of potential impact on community character; see Chapter 9). The tourism assessment is documented in:

> Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 4, Tourism Impacts, 1985.

The tourism case studies are documented in:

> Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 5, Comparative and Parallel Studies of Tourism Impact, 1985.

The municipal finance and services and economic base assessments were applied to the comparison of alternatives within siting options and comparison of the siting options as discrete analyses. These assessments are provided in:

> Clayton Research Associates Limited, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Economic Base, 1985a.

> Clayton Research Associates Limited, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Municipal Finance and Services Analysis, 1985b.

This report is divided into three parts. Part 1 includes three chapters: Introduction, Identification of Factors and Indicators, and Data Collection. It provides an introduction to social impact analysis and the OWMC site selection process (Chapter 1), the social factors and indicators (Chapter 2) and data collection process (Chapter 3). Part 2, Comparison of Alternatives Within Siting Options, documents the refinement of site boundaries for PI1N, LF3C, and LF1E (Chapter 4), the comparison of rail access alternatives (Chapter 5), the comparison of access route options to identify preferred access routes to each site (Chapter 6) and the analysis undertaken to determine the preferred location of the physical/chemical treatment plant for the siting options of PI13N/LF4N, PI1N/LF4N, and PI27E/LF1E (Chapter 7). Part 3, Comparison of Siting Options, documents the existing environment of the candidate sites and community concerns (Chapter 8), the refinement of the social factors and indicators, their aggregation, the comparison of the siting options (Chapter 9) and issues relating to monitoring, compensation and mitigation (Chapter 10).

## SITE LF2N

Eight candidate sites were identified in Phase 3B to undergo detailed comparative evaluation. During Phase 4A, the hydrogeologic consultants, Gartner Lee Associates Ltd., determined that site LF2N would not provide the required natural containment. Hence, LF2N was dropped from further consideration in May, 1985. (Refer to M.M. Dillon Ltd., Site Selection Process, Phase 4A: Interim Site Selection Report, Candidate Site LF2N, 1985 for documentation of this decision). In the social analysis report, LF2N is included until the point at which it was dropped from the study process. LF2N appears in the analysis up to and including access route options. In the analysis of the location of the physical/chemical treatment plant for partially integrated siting options and the comparison of the siting options, LF2N is not included.

# CHAPTER 2

## IDENTIFICATION OF FACTORS

The aim of this social analysis is to determine who or what will be affected by the proposed OWMC facility and in what way. "Factor Groupings" is the term used in this study to describe who or what is affected while "factors" describe the type of changes that will or might occur and that can be described or measured in some way.

Specific factors were identified for this social analysis by the professional staff at IER, in consultation with other social impact professionals and with reference to the social impact assessment literature.

The Phase 3B factors were reviewed and refined and additional factors developed to permit the appropriate level of analysis in Phase 4A. It should be noted that the factors and their related indicators and sub-indicators have been made available to the public and in particular to community associations in affected municipalities for their review and comment.

*The factor groupings and factors used in this study are as follows:*

- *Impacts on Residents*
    - *Displacement*
    - *Disruption of day-to-day activities and/or the use and enjoyment of property*
- *Impacts on Community and Recreation Features*
    - *Displacement*
    - *Disruption of operations*
- *Impacts on Community and Region*
    - *Social stability*
    - *Social cohesion*
    - *Community character*

*The factors are discussed in detail in the factor sheets which appear in Appendix A.*

*The factor sheets provide a definition and rationale for the factors as well as indicate the methods and indicators used to operationalize the factors. The rationale for the factors used at the various steps of the site selection process are provided in the following chapters under sections titled "Identification of Factors and Indicators". The factors and indicators used at each stage in the Phase 4A site selection process are identified in Tables 2.1 and 2.2.*

### TABLE 2.1
### FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACTS ON RESIDENTS | | | | | | |
| Site | Displacement | | ● | ● | ● | | |
| | | ● Number of Residents Displaced | ● | ● | ● | | |
| | | ● Characteristics of Those Displaced | ● | ● | | | |
| | | ● Attachment to Place of Those Displaced | ● | ● | | | |
| Rail Access Options | | ● Number of Residents | | | ● | | |
| Adjacent | Disruption of Day-to-Day-Activities and/or the Use and Enjoyment of Property | | ● | ● | ● | ● | ● |
| | | ● Number of Residents Spending Most Time on Properties Adjacent to Site | ● | | | | |
| | | ● Number of Residents Adjacent to Site | ● | ● | | | |

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | **IMPACTS ON RESIDENTS** | | | | | | |
| Site Vicinity | Disruption of Day-to-Day Activities and/or the Use and Enjoyment of Property | | | | | | |
| | | ● Number of Residents Spending Most Time on Properties Within 55dBA Noise Impact Zone | ● | | | | |
| | | ● Number of Residents Within Noise Impact Zone | ● | | | | ● |
| | | ● Visual Intrusion | ● | | | | |
| | | ● Number of Residents Within Site Vicinity | ● | | | | |
| Access Routes - Adjacent | | ● Number of Resident Adjacent to Access Route | ● | | | ● | |
| | | ● Characteristics of Residents | ● | | | | |
| | | ● Impact Index | ●[1] | | | | ● |

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[1] The Impact Index was used only as a sensitivity test in the comparison of the siting options.

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS
AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACTS ON RESIDENTS | | | | | | |
| | Disruption of Day-to-Day Activities and/or Use and Enjoyment of Property | | | | | | |
| Access Routes - Vicinity | | • Number of Residents Within Noise Impact Zone | • | | | | |
| | | • Number of Residents Within Access Route Vicinity | • | | | • | |
| | | • Impact Index | •[1] | | | | • |
| Rail Access - 170 Metre Impact Zone | | • Number of Residents | | | • | | |
| - 250 Metre Impact Zone | | • Number of Residents | | | • | | |

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1. The Impact Index was used only as a sensitivity test in the comparison of the siting options.

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACT ON COMMUNITY AND RECREATION FEATURES | | | | | | |
| Site | Displacement | | ● | ● | ● | | |
| | | ● Number of Features Displaced | ● | | | ● | |
| | | ● Number of Significant Features Displaced | ● | | | | |
| | | ● Number and Characteristics of Community and Features Displaced | | ● | | | |
| Rail Access Options | | ● Number of Features Displaced | | | ● | | |

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS
AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACTS ON COMMUNITY AND RECREATION FEATURES | | | | | | |
| Adjacent to Site | Disruption of Operations | | ● | ● | ● | ● | ● |
| | | ● Number of Sensitive Features Adjacent to Site | ● | | | | |
| | | ● Number of Features Adjacent to Site | ● | ● | | | |
| Site Vicinity | | ● Number of Sensitive Features Within Noise Impact Zone | ● | | | | |
| | | ● Number of Features Within Noise Impact Zone | ● | | | | |
| | | ● Characteristics of Use and Users of Features | | ● | | | |
| | | ● Number of Sensitive Features Within Site Vicinity | ● | | | | |
| | | ● Number of Features Within Site Vicinity | ● | | | | |

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS
AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACTS ON COMMUNITY AND RECREATION FEATURES | | | | | | |
| Access Routes - Adjacent | Disruption of Operations | • Number of Sensitive Features Adjacent to Access Route | • | | | | |
| | | • Number of Features Adjacent to Access Route | • | | | | |
| | | • Number and Characteristics of Features | | | | • | |
| | | • Impact Index | •[1] | | | | • |
| Access Route - Vicinity | | • Number of Sensitive Features Within Noise Impact Zone | • | | | | |
| | | • Number of Features Within Noise Impact Zone | • | | | | |
| | | • Number of Sensitive Features Within Access Route Vicinity | • | | | | |
| | | • Number of Features Within Access Route Vicinity | • | | | | |
| | | • Number and Characteristics of Features | | | | • | |
| | | • Impact Index | •[1] | | | | • |

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1. The Impact Index was used only as a sensitivity test in the comparison of the siting options.

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACTS ON COMMUNITY AND RECREATION FEATURES | | | | | | |
| Rail Spur Line | | | | | | | |
| - 170 Metre Impact Zone | | • Number of Features | | | ● | | |
| - 250 Metre Impact Zone | | • Number of Features | | | ● | | |
| | IMPACTS ON COMMUNITY AND REGION | | | | | | |
| Community and Region | Social Stability | | ● | | | | |
| | | • Stability Index | ● | | | | |
| | | • Disruption Through Resident Displacement | ● | | | | |
| | | • Municipal Growth (1971-1981) | ● | | | | |
| | | • Disruption Through Out-Migration | ● | | | | |

TABLE 2.1
FACTORS AND INDICATORS USED IN COMPARISON OF SITING OPTIONS
AND COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| STUDY AREA | FACTOR GROUPING/ FACTOR | INDICATOR | COMPARISON OF SITING OPTIONS | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/ Chemical Treatment Plant |
| | IMPACTS ON COMMUNITY AND REGION | | | | | | |
| | Social Cohesion | | • | | | | |
| | | • Disruption Through Resident Displacement | • | | | | |
| | | • Disruption Through Out-Migration | • | | | | |
| | | • Number of Community Features Contributing to Cohesion Disrupted | • | | | | |
| | Community Character | | • | | | | |
| | | • Compatibility with Land Use | • | | | | |
| | | • Heritage Features | • | | | | |
| | | • Visual Compatibility | • | | | | |

### TABLE 2.2
### PHASE 3B FACTORS AND INDICATORS USED IN COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

| FACTOR GROUPING/ FACTOR[1] | INDICATOR[1] | COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS | |
|---|---|---|---|
| | | Rail Access Options | Access Route Options |
| SOCIO ECONOMIC CHARACTERISTICS | | | |
| Estimated Population | • Dwelling Counts | • | • |
| | • Average Household Size | • | • |
| Population Concentrations | | | |
| | • Number and Population | • | • |
| Community and Recreation Features | | | |
| | • Number and Type of Community and Recreation Features | • | • |

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1. These Phase 3B factors and indicators were used in the constraint mapping exercise of the analysis of rail access options and preliminary analysis of access route options. The study areas used in the constraint mapping exercise of rail access analysis were provided by M.M. Dillon Ltd. (Transportation). The factors relate to the area adjacent to the access routes in the preliminary analysis. The application of the factors and indicators are discussed in Chapter 5, Rail Access Options and Chapter 6, Access Route Options.

Identifying the factors to focus on in the social analysis is only a first step. The key question is what do we need to know about this factor in order to be able to determine its potential significance. For example, it is obvious that people will be displaced as a result of the siting of the facility and displacement should be a factor taken into consideration. But in order to gain a full appreciation of the possible impact of displacement at each of the candidate sites, it is necessary to examine displacement in more detail. "Indicators" is the term used in this study to describe the kinds of information that would help us understand the magnitude and severity of the potential changes. Thus for the factor, displacement, three indicators were examined as shown in Figure 2.1.

1) number of residents displaced
2) characteristics of those displaced
3) attachment to place of those displaced

At each site, the intensity of the effect will depend on the number of people displaced, their characteristics and their attachment to place. Figure 2.2 diagramatically shows this relationship.

Each of the indicators contributes to our understanding of the potential impact of the displacement of people from a particular site.

## *FIGURE 2.1*

## *FACTOR GROUPING: IMPACTS ON RESIDENTS*[1]

| *FACTOR* | *INDICATOR* | *SUB-INDICATOR(S)* |
|---|---|---|
| *Displacement* | *Number of Residents Displaced* | • *residents on-site* |
| | *Characteristics of Those Displaced* | • *number over 65 years of age*<br>• *number 5-13 years of age*<br>• *number of full-time farm households*<br>• *percent of dwellings owned*<br>• *number of housewives* |
| | *Attachment to Place of Those Displaced* | • *number of households at address over 20 years*<br>• *number of households in municipality over 20 years*<br>• *number of households with ancestors previously owning property*<br>• *number of households with ancestors who lived in municipality*<br>• *number of friends in area*<br>• *number of relatives in area* |

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[1] *Refer to Appendix A, Factor Sheets for details on the indicators and sub-indicators used for the remaining factors.*

FIGURE 2.2
RELATIONSHIP BETWEEN PROJECT EFFECTS
AND SOCIAL IMPACTS

Proposed Development → Causes changes in in people's living conditions → Changes may have an impact

OWMC Facility → Displaces People → Impact depends on:

- number of people
- their characteristics (age, property ownership, etc.)
- their attachment to place (length of residence, ancestral links to property and area, etc.)

For each indicator, it was necessary to identify the specific data or information that had to be collected and that would permit comparison amongst the sites. These were termed "sub-indicators." For example, within the indicator of characteristics of the residents, sub-indicators include the number of residents between the ages of 5 and 13, the number of residents over the age of 65, the number of full-time farm households, the number of housewives, and the percent of owned dwellings. There are many ways of describing the characteristics of residents. The five sub-indicators noted above were selected either because research[1] has revealed they have a bearing on the significance of displacement or in our own professional judgement, we felt such to be the case.

Each sub-indicator permits us to describe in more detail the characteristics of the residents and hence gain a better understanding of the potential impact of siting the facility.

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[1] K. Finsterbusch. A Methodology for Social Impact Assessment of Highway Locations. Interim Report. (University of Maryland. Department of Sociology, July 1976).
K. Finsterbusch. Understanding Social Impacts: Assessing the Effects of Public Projects. (Beverly Hills Ca.: Sage PUblications, 1980).
T. Heller. "The Effects of Involuntary Residential Relocation: A Review" American Journal of Community Psychology 10 (4): 1982: 471-492.
M. Levine. "Residential Change and School Adjustment." Community Mental Health Journal 2:1966:61-69.
L. Long. "Does Migration Interfere With Children's Progress in School?" Sociology of Education 48:1975:369-381.

In addition to the identification of the factors, indicators and sub-indicators which permit the comparison of all siting options using the same quantitative data base, the social analysis relies upon qualitative information. The analysis of community character, for example, involves the use of quantitative data where possible, supplemented by a qualitative assessment of unique features or characteristics and the implications of the proposed development for these features. When warranted, qualitative information was used to adjust the ranking of sites derived from the quantitative analysis. The rationales for these adjustments are documented in the text.

# CHAPTER 3

# DATA COLLECTION AND ANALYSIS

## 3.1 INTRODUCTION

The purpose of the data collection and analysis undertaken in Phase 4A was to provide an information base for the refinement of siting options and for a detailed comparative evaluation of the options. Data collection and analysis in Phase 4A involved refinements of data gathered during Phase 3B and the collection of additional detailed data on-site and in the vicinity of each siting option and access route.

The data collection process included:

- field investigations of the candidate sites, access routes and study areas;
- contacts with agencies and representatives of community and recreation features identified during Phase 3B and the field investigations;

- a survey of residents and property owners living on-site, adjacent to each site, and in the vicinity of each site;[1]
- a survey of residents living adjacent to the access routes.

Table 3.1 identifies the data sources used for the comparison of alternatives within the siting options and comparison of the siting options. The data collected were supplemented with information provided through discussions with, and briefs submitted by, community groups and residents. These components of the data collection process are described in greater detail in the following sections. Additional information was provided by other members of the site selection team. A list of the information provided is included in Figure 1.2.

## 3.2 FIELD INVESTIGATIONS

Field investigations were undertaken of the candidate sites, their study areas (approximately 2 kilometres surrounding the site), the potential access routes and their 800 metre study areas. The field investigations were conducted to verify information collected during Phase 3B and to identify community and recreation features within the study areas for the candidate sites and access routes.[2]

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1. Residents on-site are those living on properties within the boundary of the site acquisition area. Adjacent residents are those living on properties butting or across the road from the site acquisition area. Vicinity residents are defined as all remaining residents living on properties within the 2km study area.
2. Refer to Chapter 9, for discussion on the study areas applied in Phase 4A.

## TABLE 3.1
## DATA SOURCES FOR COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS AND COMPARISON OF SITING OPTIONS

| DATA SOURCES | COMPARISON OF ALTERNATIVES WITHIN SITE BOUNDARIES | | | | COMPARISON OF OF SITING OPTIONS |
|---|---|---|---|---|---|
| | Refinement of Site Boundaries | Rail Access Options | Access Route Options | Location of Physical/Chemical Treatment Plant for Partially Integrated Siting Options | |
| Field Investigations | ● | ● | ● | ● | ● |
| Walk and Talk Survey | ● | | | | ● |
| Access Route Survey | | | | | ● |
| Agency Contacts | | | ● | | ● |

Data on community and recreation features were recorded on field observation forms. The data gathered included,

- The location of each feature. The location was mapped during the field investigation.
- A general description of each feature. The description included the level of use at the time of the field investigation and whether or not the feature is used seasonally. Signs in some instances provided information regarding the programs and services offered at the feature and the hours of use.
- Distinguishing characteristics of the feature. These included special characteristics such as historic significance,[1] ethnic or religious affiliation, properties for sale or buildings under construction or renovation.

The data obtained through the field investigations were compiled into matrices to assist in the refinement and analysis of the siting options. Based on the field investigations, a number of agencies were also identified to be contacted for detailed information.

Access routes to siting options had been identified and analysed in a preliminary fashion during Phase 3B of the study. In Phase 4A several new access routes that were identified by M.M. Dillon Ltd. (Transportation)[2] These access routes were first analysed in the same preliminary manner as access routes studied in Phase 3B. This permitted the elimination of some access route options prior to the detailed analysis of the access route options in Phase 4A. Therefore, in addition to the information on features along access routes compiled for the Phase 4A assessment, the following data were compiled for the preliminary assessment of the access routes:

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[1] Historic significance was generally determined through signs. In some instances, features were identified by field staff as possibly historic because of their general appearance. A detailed heritage assessment of each candidate site and 2km study area was conducted later in the process by the heritage consultant. See Institute of Environmental Research Inc. Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis Appendices, Volume 2, Heritage Assessment, 1985.

[2] Refer to Chapter 6.0, Access Route Options.

- Estimated population adjacent to each access route - a dwelling count was taken for each access route. The dwelling count was multiplied by the average household size (1981 Census) for the municipalities in which the access route was located to obtain a population estimate.
- Population concentrations. Population concentrations were noted along the access routes. Population concentrations refers to any cluster of residents and includes a range from rural residential strip developments, hamlets and villages, up to small towns and larger municipalities. The number of people residing in the concentrations were obtained through a variety of sources: the 1981 Census, municipal assessment data or estimates from municipal representatives. In instances where formal population figures were not available, dwelling counts and average household size were used to estimate population.

## 3.3 AGENCY CONTACTS

Federal and provincial government ministries, regional and local municipalities, conservation authorities, and school boards were contacted for information on community and recreation features. Appendix B contains a detailed list of all agencies contacted during the data collection phase. Appendix C contains a list of the type of features for which detailed information was collected during the agency contacts and copies of information record sheets used for requesting data, by type of feature or service.

Many of the agencies contacted during Phase 3B had provided data on existing and proposed community and recreation features located in candidate areas and in candidate site study areas. During Phase 4A relevant agencies were contacted with a request for detailed information on features identified on-site, in Phase 4A study areas and along access routes. In addition to requests for data on known existing and proposed features, all regional and local government departments responsible for the operation of community and recreation facilities in municipalities containing candidate sites and potential access routes were contacted to ensure that all relevant features had been identified. The owners and/or operators of private community and recreation features identified during field investigations or by public agencies were also contacted for information.

In addition to data on specific features, information on emergency services was collected for municipalities containing candidate sites and/or access route options. These data were not used for site selection but rather as baseline information on the level of emergency services available in the municipalities to be used in determining the necessary level of emergency services. School boards were also requested to provide data on bus routes coinciding with potential access routes. In addition to use by IER, in the comparison of access route options to the potential sites, these data were provided to M.M. Dillon Ltd. (Transportation) to be used as part of the assessment of potential risk along access routes.

An appropriate individual representing each agency was contacted initially by telephone to explain the purpose and details of the study and obtain approval to submit a written request for information. Relevant background material from Phase 3B, maps showing the locations (if known) of existing and proposed features in relation to the site, study areas or access route study areas, and a detailed outline of requested information was mailed to the designated contact person. In cases where agencies refused to provide information, a letter was sent to the agency confirming the refusal.

If necessary, approximately two weeks after the information request was sent, a follow-up call was made to check on the progress of the request. After three follow-up calls to each agency that had initially agreed to respond, no further contact was made with respect to replies not yet received.

Upon receipt of a reply, the data were reviewed in order to identify missing information and/or details requiring clarification. Subsequent calls were made to complete the request or to verify that missing data were not available. Upon receipt of all available information, a letter was sent outlining the data received and the agency was asked to identify inaccuracies or misinterpretations or to submit additional comments. Samples of agency contact letters are contained in Appendix C.

Meetings with various community groups involved in the site selection process were held to collect and/ or verify information relevant to this phase of the study. At these meetings, participants reviewed, questioned and criticized site-specific data as generated through agency contacts and the socio-economic survey of residents. When warranted, this feedback initiated data review, clarification and/or revision in order to eliminate inaccuracies and misinterpretations in the information base. A list of meetings held with community groups is in Appendix C.

## LIMITATIONS AND CONSTRAINTS FOR AGENCY CONTACTS

Inability to make contact with a few of the agencies resulted in limited information on certain features. Similarly, refusals to participate in the study or lack of response from several agencies initially agreeing to submit information produced some gaps in the data base.[1] In other instances, the information provided was not complete and/or comparable.

The information gathered was a reflection of conditions existing at the time the study was undertaken and so does not account for any subsequent changes.

The above limitations in data collection resulted in some difficulty in assessing the significance of some features. These limitations, however, did not impede the analysis of the community and recreation features as a whole. The data gathered on community and recreation features were adequate for the purposes for which they were employed.

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[1] Non-responses or refusals to participate in the study resulted in limited information on 11 features. Five of these were associated with LF2N which was dropped prior to the comparative evaluation of siting options. The six remaining features included two horse riding/boarding facilities, a snowmobile club, a country club, a municipal park and a proposed trailer park. Only one of these features, a horse riding establishment, was located adjacent to a site or access route. The remainder were vicinity features. Non-responding agencies are noted in the Agency Contact List in Appendix B.

## 3.4 WALK AND TALK SURVEY

The Walk and Talk Survey was a major source of data for the Phase 4A social evaluation of the candidate sites. Information was collected on community and household characteristics and the respondent's opinions and concerns regarding the proposed waste treatment and disposal facilities. A copy of the survey is contained in Appendix C.

Residents and property owners on-site, adjacent to and in the vicinity of the eight candidate sites were surveyed. Personal interviews were conducted with resident households and absentee landowners on-site or adjacent to the site, tenant farmers who own or farm property on-site or adjacent to a site and households farming land in the vicinity of each site.

OWMC used the Ontario Ministry of Revenue assessment role information (1984) to compile a mailing list of names, phone number, addresses, property assessment roll numbers and property uses (i.e. farm versus non-farm) for residents and non-resident property owners. OWMC mailed a copy of the interview form along with a letter of explanation to all households that were to be interviewed and then proceeded to schedule interviews with these households.

Attempts to reach interviewees by telephone to schedule an interview were made at least three times; if the interviewee could not be reached by telephone, a registered letter was mailed to notify the interviewee that OWMC wished to schedule an interview. OWMC provided the interview schedule to staff from IER and Ecologistics who administered the interview at the pre-arranged time and location. If an interviewee was not at home at the time of the scheduled interview, OWMC was notified and the interview was rescheduled.

In a few instances, interviews were not completed because households could not be contacted by OWMC or refused to be interviewed.

Interviews were undertaken during the summer of 1984. Properties associated with the completed interviews were noted on a property base map.

Completed interview forms were sent to OWMC. OWMC copied the entire interview form for its files and forwarded all socio-economic sections to IER.

OWMC, with criteria developed by Ecologistics, defined farm and non-farm properties and assigned all farm interviews in the candidate site area to Ecologistics.[1] IER was assigned to interview all on-site and adjacent non-farms and to administer the drop-off surveys to non-farm properties in the study area.

Due to the time and cost involved, it was not possible to interview the large number of non-farm households in the vicinity of the candidate sites. Instead, self-administered questionnaires were dropped-off to all non-farm households in the 2km vicinity of the candidate sites. Prior to the questionnaires being dropped-off, a letter was sent by OWMC to notify these households that they would be receiving a questionnaire. The questionnaires were hand-delivered. If no one was home at the time of delivery, a questionnaire was left in a safe place where it could be found by a household member (e.g. behind a screen door, in a mail slot, etc.)

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1. Refer to Ecologistics Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Agriculture, 1985 for details on the farm interviews.

All drop-offs were noted on property boundary maps and documented on field forms which recorded the survey identification number, the property assessment roll number, and, where possible, the name and address of the recipient. Properties not receiving a drop-off questionnaire were also documented with reasons (e.g. vacant property, driveway barred, etc.).

In a few instances, residents beyond the study area were surveyed. Residents of Meadowvale, which is located beyond the LF2N study area, were surveyed at their request. A few people residing beyond other candidate site study areas requested interviews also.

The drop-off questionnaires were administered in two rounds. The first round was completed using property boundary maps based on assessment rolls as a reference for drop-offs. After comparing the property boundary drop-off maps to the master assessment roll lists supplied by OWMC, those properties missed during the first round were identified, and those which had adequate addresses to allow delivery received a questionnaire during the second round of drop-offs. The questionnaires were delivered during July, 1984.

The recipients of the self-administered questionnaires were supplied with a pre-paid envelope to mail the questionnaire directly to IER once it was completed. In order to improve the response rate, reminder cards were sent to all questionnaire recipients approximately one week after the drop-offs were completed.

The self-administered questionnaire was an abbreviated form of the personal interview. The copy of the walk and talk survey in Appendix B identifies the questions which were excluded from the drop-off questionnaire.

There were a total of 729[1] responses (farm and non-farm) to the personal interviews and drop-off questionnaires for the eight candidate sites. Of these, 62 (8.5%) were on-site interviews (43 residents, 19 non-residents), 90 (12.3%) were interviews of households adjacent to the site (62 residents, 28 non-residents) and 577 (79.1%) were households in the site vicinity (522 residents, 55 non- residents). Of the 577 vicinity responses, 334 (57.9%) were self-administered questionnaires and 243 (42.1%) were personal interviews.[2]

Twenty-seven surveys were returned from the overlap area where the site vicinities for LF1E and PI27E overlap and 31 surveys from the overlap area for sites PI1N and LF4N. Table 3.2 provides the number of completed interviews and returned self-administered questionnaires and the response rate for each siting option.

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1. The self-administered questionnaires dropped-off to Meadowvale residents have not been included. Thirty self-administered questionnaires were received from Meadowvale residents.
2. These site vicinity personal interviews were administered by Ecologistics Ltd.

## TABLE 3.2
## SURVEY RESPONSE AND RESPONSE RATES FOR RESIDENTS SITE, ADJACENT AND VICINITY

| | Siting Option | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | LF3C | LF9C | PI27E/LF1E | LF1E | PI1N/LF2N | PI13N/LF2N | PI1N/LF4N | PI13N/LF4N |
| **Site** | | | | | | | | |
| - Number of Completed Interviews | 6 of 6 | 2 of 3[4] | 13 of 15 | 15 of 16 | 8 of 10 | 7 of 9 | 9 of 11 | 8 of 10 |
| - Response Rate[1] (%) | 100.0 | 67.0 | 87.0 | 94.0 | 80.0 | 78.0 | 82.0 | 80.0 |
| **Adjacent** | | | | | | | | |
| - Number of Completed Interviews | 9 of 11 | 7 of 9 | 8 of 11 | 5 of 7 | 15 of 27 | 17 of 29 | 20 of 27 | 22 of 29 |
| - Response Rate[1] (%) | 81.8 | 78.0 | 72.7 | 71.4 | 56.0 | 59.0 | 74.1 | 75.9 |
| **Vicinity** | | | | | | | | |
| - Number of Completed Interviews and Drop-off Questionnaires[2] | 103 of 164 | 51 of 66 | 140 of 275 | 105 of 208 | 88 of 140 | 95 of 192 | 140 of 194 | 168 of 273 |
| - Response Rate[1] (%) | 62.8 | 77.0 | 50.9 | 50.5 | 63.0 | 49.0 | 72.2 | 61.5 |
| **Overall** | | | | | | | | |
| - Number of Completed Interviews and Drop-off Questionnaires | 118 | 60 | 161 | 125 | 111 | 119 | 169 | 198 |
| - Total Possible Interviews and Drop-off Questionnaires | 181 | 78 | 301 | 231 | 177 | 230 | 232 | 312 |
| - Response Rate[1] (%) | 65.2 | 76.9 | 53.5 | 54.1 | 62.7 | 51.7 | 72.8 | 63.5 |

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1. Response rate is given for residents only. Meadowvale drop-off questionnaires have not been included in the total because Meadowvale is located outside of the LF2N 2km zone. Thirty self-administered questionnaires were received from Meadowvale residents.
2. A number of farm households were interviewed in the site vicinity by Ecologistics. See Ecologistics Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985 for details.
3. The total has been calculated to prevent double counting of overlapping sites and siting options.
4. In a subsequent field investigation it was determined that two households reside on LF9C and a third dwelling is vacant. Hence the response rate for on-site interviews for LF9C is 100%.

## CODING AND TABULATION

The socio-economic data from the surveys were coded and computerized to provide frequencies and cross tabulations by candidate siting options.[1] Responses to open-ended questions were categorized to facilitate statistical interpretation of the data.

Several checks and tests were conducted on the computerized data to ensure that the data base was accurate and the coding consistent.

- visual scanning of the validation printout to check for key punch errors
- cross checking of survey identification number with the candidate site, the type of delivery (on-site versus adjacent versus vicinity), the assessment roll number and the type of property (farm versus non-farm, resident versus non-resident)
- hand tabulation of on-site and adjacent information
- cross-checking of IER farm survey property codes with Ecologistics farm survey property codes.

Once the data base was verified, a computer program was designed to tabulate the data for use in the analysis.

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[1] Frequencies are the number and percentage of responses, by question. Cross tabulations refer to the responses in two given categories simultaneously (e.g., the number of on-site residents who are also 65 years of age or older).

The following were considerations when coding the surveys.

- Residents were separated from non-residents. It was critical for certain analyses, such as displacement or disruption of individuals, to exclude non-residents from the data base.
- There are two pairs of candidates sites with overlapping study areas; LF1E and PI27E in Niagara Falls and LF4N and PI1N in Milton. Survey data from households on properties in the overlapping areas were coded so that they would be counted only once in the analysis.
- The property location code identified each property as one of: on-site, adjacent, vicinity interview, vicinity drop-off.
- Where a property was divided by the proposed site boundary, the entire property is assumed to be an on-site property.
- The site code refers to the eight candidate sites: LF3C, LF9C, LF1E, PI27E, PI1N, PI13N, LF4N, LF2N.
- The siting options were amalgamated by the computer program: LF3C, LF9C, LF1E, LF1E/PI27E, PI1N/LF4N, PI1N/LF2N, PI13N/LF4N PI13N/LF2N.
- All interview identification numbers were assigned by OWMC. All drop-off questionnaire identification numbers were assigned by IER.
- A property status code was used to distinguish farm from non-farm and residents from non-residents.
- Where a respondent owned or rented more than one property, the interview was coded with respect to the location of the respondent's residence (i.e., if a respondent owned property on-site and in the vicinity and the respondent's home was in the vicinity, the interview was coded as a vicinity interview). Non-residents (i.e., absentee landlords, tenant farmers) were coded according to the location of the property owned/farmed. If the respondent was a non-resident and owned/farmed more than one property, the property closest to the site was coded.

## 3.5 ACCESS ROUTE SURVEY

Data from the access route survey were used in combination with other information to compare the candidate siting options. The access route survey compiled data on the characteristics of the respondent's household, present concerns with traffic on the access route, activities inhibited by present traffic, perceived effects from increased traffic and comments to OWMC. A copy of the access route questionnaire is contained in Appendix B.

### DELIVERY OF THE ACCESS ROUTE SURVEY

All residences on properties with a boundary adjacent[1] to an access route received a self-administered questionnaire.[2] Residences within the 800 metre study area[3] but not adjacent to the access routes did not receive questionnaires.

During the week of November 15 to 23, 1984, IER dropped off a self-administered socio-economic questionnaire to all non-farm residential properties bordering an access route. Ecologistics dropped off and picked-up a combination agricultural/socio-economic questionnaire to all farm properties along the access routes except those along portions of the routes inside the 2km study areas of the Milton and West Lincoln sites since Ecologistics had previously collected agricultural access route information from these farm properties. IER dropped off a socio-economic access route questionnaire to these farm properties.

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1. Adjacent properties are those which abut an access route.
2. There were a total of 30 access routes for the eight siting options. A key to the access routes is provided in Appendix D. The access routes are shown on Figures 6.1 to 6.12 in Chapter 6, Access Route Options.
3. See Chapter 6 for the definition and rationale for the 800 metre study area.

The drop-off package included a covering letter from OWMC and the OWMC publications, "Questions and Answers," and "Phase III Summary," to provide a background of OWMC's activities and request that the recipient complete the questionnaire. A pre-paid return envelope was included in the package so that the completed questionnaire could be mailed back to IER.

The access route drop-offs were marked on a 1:10,000 scale photomasaic working maps and documented on forms which included the identification number, the assessment roll number and, where possible, the name and address of the questionnaire recipient. If when Ecologistics was picking up a questionnaire it was discovered that the resident of a house was a non-farmer, the resident was requested to fill out the IER socio-economic questionnaire. The questionnaire was then forwarded to IER by the interviewer. There were thirteen such cases.

There was a total of 632 (514 non-farm, 116 farm) self-administered access route questionaires dropped-off and 303 (234 non-farm, 69 farm) returned for a response rate of 47.9%. Table 3.3 lists the response rates for the preferred access route for each siting option.

## CODING AND TABULATION

The data from the surveys were coded and computerized to provide frequencies for the socio-economic data by access route.

# TABLE 3.3
# RESPONSE RATES FOR THE PREFERRED ACCESS ROUTES BY SITING OPTION

| Siting Option[1] | Response Rate (%)[2] |
|---|---|
| LF3C | 52.5 |
| LF9C | 55.0 |
| PI27E/LF1E | 33.3 |
| LF1E | 33.3 |
| PI1N/LF2N | 43.7 |
| PI13N/LF2N | 43.2 |
| PI1N/LF4N | 44.7 |
| PI13N/LF4N | 44.1 |

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1. Each property is counted once per siting option.
2. The overall response rate for the preferred access routes is 47.9%.

## SURVEY LIMITATIONS AND CONSTRAINTS

Ideally, the surveys would have produced comparable primary data on all residents on-site, adjacent to the site, in the site vicinity, and adjacent to the access route. Not all residents contacted, however, responded to the surveys. In some instances, therefore, missing information required the substitution of estimates for primary data. For example, if the exact number of residents on-site was not available because an on-site household did not complete an interview, it was necessary to estimate using the number of residents reported by responding households and average household size.

In cases where estimates were inappropriate, the data applied to the factors and indicators were based solely on survey responses, and so did not include non-responding households. For example, no attempt was made to estimate the characteristics of residents (e.g. age, length of residence, etc.) in non-responding households in the two kilometre study area.

The survey results are a reflection of conditions at the time the study was undertaken and so do not account for any subsequent changes. Despite the above-noted limitations, the survey response rates were considered to be high enough that the resulting data are adequate for their application to the comparative analysis.

# PART 2

# COMPARISON OF ALTERNATIVES WITHIN SITING OPTIONS

# CHAPTER 4

# REFINEMENT OF SITE BOUNDARIES

## 4.1 INTRODUCTION

The site acquisition areas as defined in Phase 3B, for candidate sites PI1N, LF3C and LF1E[1] are larger than that required for facility development. Therefore identification of a refined site boundary for each of these sites was required prior to comparing the siting options. To determine the precise boundaries of these sites which would be used in the detailed comparative evaluation, the site selection consultants undertook a constraint analysis.

This chapter documents the social analysis undertaken in the refinement of site boundaries.

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[1] No site boundary refinements were required for LF1E as an integrated site. Refined site boundaries were investigated for LF1E as a partially integrated site.

## 4.2 STUDY APPROACH AND ASSUMPTIONS

As noted in Section 4.1, the site boundaries for candidate sites PI1N, LF3C and LF1E were refined by the site selection team through a constraint mapping exercise. However, the factors and indicators used in the social analysis, for example, the number of residents displaced, are not well adapted to constraint mapping. (See Section 4.3 for the factors and indicators applied for site boundary refinement). Furthermore, through the site selection activities of Phase 3B, major constraints such as population concentrations and major community and recreation features were identified. No such constraints are located on or near sites PI1N, LF3C and LF1E. Hence, prior to the social analysis for site boundary refinement, other members of the site selection team identified major constraints through the constraint mapping approach and portions of sites were excluded. The remaining portions of a site were divided into parcels to facilitate comparisons from a social perspective.

The number of residents and features displaced would depend on the parcel selected for development. Consequently, the number and characteristics of residents and features potentially displaced were considered. Where the difference in potential impacts through displacement of residents and features was negligible among the site parcels, off-site impacts in terms of potential disruption of nearby residents and features were considered.

## 4.3 IDENTIFICATION OF FACTORS AND INDICATORS

The factors applied for parcel option comparison were:

- displacement of residents

- displacement of community and recreation features
- disruption of day-to-day activities and/or the use and enjoyment of property (where required)
- disruption of operations of community and recreation features (where required).

The specific indicators and sub-indicators used for each of the factors are noted below.

## DISPLACEMENT OF RESIDENTS

### Number of residents displaced

Since each parcel option covered a different area within the site acquisition area boundary, the number of residents potentially displaced could vary. The number of people residing within each parcel option boundary was used to compare the options.

### Characteristics of people displaced

Research indicates that the potential hardships resulting from displacement are also a function of an individual's socio-economic characteristics.[1] Children and the elderly are likely more dependent upon their local community due to their lack of mobility and/or financial resources. Homeowners, having made an investment in a particular property and residents with leadership roles in community groups[1] display a higher degree of involvement in and commitment to the community.

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[1] K. Finsterbusch, A Methodology for Social Impact Assessment of Highway Locations. Interim Report. (Department of Sociology, University of Maryland, July 1979).
K. Finsterbusch, Understanding Social Impacts: Assessing the Effects of Public Projects. (Beverly Hills, California: Sage Publications, 1980).
M. Fried, "Grieving for a Lost Home". L.J. Duhl (ed.) The Urban Condition. (New York: Basic Books, 1963).

The characteristics applied in the analysis were age (the number of people 13 years of age and under and 65 years of age and older), tenure (number of homeowners) and households with members with leadership roles in community groups.

Attachment to place

In addition to socio-economic characteristics, the potential hardship resulting from displacement is a function of an individual's attachment to place.[2] Higher levels of attachment to place are likely to be displayed by long-time residents. Length of residence at current address is the accepted measure of attachment. We also felt that attachment might encompass the broader community and consequently length of residence in the municipality was used as an additional measure of attachment to place.

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[1] In the subsequent comparison of siting options, the sub-indicator, residents with leadership roles in community groups, was applied as a measure of social cohesion rather than displacement. Refer to Section 9.3, Identification of Factors and Indicators for the rationale for this refinement.

[2] Ibid.

## DISPLACEMENT OF COMMUNITY AND RECREATION FEATURES

### Number and Characteristics of Community and Recreation Features Displaced

The number of community and recreation features displaced provides a quantitative measure of impact. The assumption is that potential adverse impacts of displacement for both users of the feature and the community required to supply alternatives would increase in proportion to the number of features displaced.

As a result of the Phase 3B site selection process, the candidate sites had few community and recreation features located within their boundaries. The only features located on the parcel options included possible historic buildings[1] and a horse riding stable (for which no information was available). Consequently, characteristics of users and the use of these features were not used in the analysis of parcel options.

## DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY

Where the indicators relating to on-site impacts failed to identify differences among a site's parcel options, consideration was given to the differences in the potential disruption of residents living adjacent to the parcel options. The indicator contributing to this factor was:

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[1] The terms "heritage" and "historic" have been used interchangeably throughout this report. The terms refer to man-made remains of the past. A heritage or historic feature may be an old structure of little other importance or a significant historic feature due to its architecture, landscape setting or association with an historic event or person. Refer to Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices. Volume 2 - Heritage Assessment, 1985.

- *Number of residents adjacent to the parcel option.*

### *DISRUPTION OF OPERATIONS OF COMMUNITY AND RECREATION FEATURES*

*Where the indicators described above failed to identify differences among a site's parcel options, consideration was given to the differences in the potential disruption of the operations of community and recreation features within the study area. Indicators contributing to this factor were:*

- *Number of features adjacent to the parcel options.*
- *The characteristics of the use and users of the feature (i.e. sensitive users, duration of use, time of use).*

*The indicators and sub-indicators used for site boundary refinement were not as inclusive as those ultimately used for the comparison of the siting options. Refinements to factors, including additions of indicators and sub-indicators were made throughout Phase 4A, based on further research, professional judgement and public input.*

*The indicators and sub-indicators comprising the factors noted above are those which were clearly identified in research or our professional judgement as measures of these factors, at the time of the site boundary refinement exercise. While the social analysis is not as detailed as that applied during siting option comparison, it is sufficient for site boundary refinement.*

## 4.4 DATA COLLECTION

The data sources[1] for the indicators were:

- field investigations of each candidate site and where applicable, candidate site study area, to identify community and recreation features
- results of the walk and talk survey for residents and property owners on-site and adjacent to the site. The survey provided household profile data which were used in the comparison of the parcel options. The survey data were re-tabulated to correspond to the various parcel option boundaries.
- the location of residential dwellings on-site and adjacent to and the average household size of the enumeration area within which the parcel option is located (from the 1981 Census). These were used to estimate residential population for those households not returning a survey.

The data obtained through these sources were compiled into a matrix (Table 4.1). The locations of the community and recreation features were mapped at 1:10,000 scale (see M.M. Dillon Ltd., Site Selection Process. Phase 4A: Selection of a Preferred Site(s), Site Selection, 1985. The matrix and maps assisted in the comparison of the parcel options.

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[1] Refer to Chapter 3.0, Data Collection and Analysis for a discussion of the data collection process.

## 4.5 ANALYSIS

Following the constraint mapping exercise undertaken by other members of the site selection team, the remaining portion of each of the candidate sites, PI1N, LF3C and LF1E were divided into parcel options. Table 4.1 provides the data by factor and indicator used to compare the parcel options. The parcel options delineated for these three sites are noted on Figures 4.1-4.3 at the end of this chapter. Descriptions of the parcel options are provided below.

### PI1N

The site selection team identified a major airport navigation constraint with the western half of PI1N. This constraint is documented in the M.M. Dillon Ltd. Site Selection report, 1985. The eastern half of the site remained for consideration. Of this half, either the north or south portions were suitable for facilities development.

The east half of the site was divided into two parcels to be compared (see Figure 4.1).

### Parcel Option 1

Parcel Option 1 is located in the northeast corner of the original boundary.

An estimated 15 residents are located within the boundaries of Parcel Option 1. Seventy-five percent of the households responding to the survey are homeowners. One of the responding households has a member or members with leadership roles in community groups. No residents of 13 years of age or younger or 65 years of age or older were identified. Two of the respondents have lived at their current address and in Milton for 20 years or more.

TABLE 4.1
REFINEMENT OF SITE BOUNDARIES
COMPARISON OF PARCEL OPTIONS

| FACTOR/INDICATOR | SITE PI1N | | SITE LF3C | | SITE LF1E | |
|---|---|---|---|---|---|---|
| | Parcel Option 1 | Parcel Option 2* | Parcel Option 1 | Parcel Option 2* | Parcel Option 1 | Parcel Option 2* |
| A. DISPLACEMENT OF RESIDENTS | | | | | | |
| • Number of People Displaced | 15 | 16 | 35 | 29 | 21 | 23 |
| • Characteristics of Those Displaced[1] | | | | | | |
| - Population <13 years of age | 0 | 0 | 14 | 9 | 2 | 2 |
| - Population >65 years of age | 0 | 2 | 3 | 1 | 3 | 4 |
| - No./% of homeowners | 3 (75%) | 4 (100%) | 4 (67%) | 4 (67%) | 7 (87%) | 8 (89%) |
| - No. of households with member(s) with leadership roles in community groups | 1 | 0 | 3 | 3 | 1 | 1 |
| • Attachment to Place of Those Displaced[1] | | | | | | |
| - No. of households at current address >20 years | 2 | 2 | 1 | 1 | 2 | 2 |
| - No. of households in municipality >20 years | 2 | 2 | 4 | 3 | 5 | 7 |
| B. DISPLACEMENT OF COMMUNITY AND RECREATION FEATURES | | | | | | |
| • Number of Features Displaced | 4 - Hunterbrook Farms<br>- 3 Possible Historic Buildings[2] | 3 - Possible Historic Buildings | 2 - Possible Historic Buildings | 3 - Possible Historic Buildings | 5 - Possible Historic Buildings | 5 - Possible Historic Buildings |
| C. DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY | | | | | | |
| • Number of Adjacent Residents | 21 | 54 | 39 | 39 | 23 | 19 |
| D. DISRUPTION OF OPERATIONS OF COMMUNITY AND RECREATION FEATURES | | | | | | |
| • Number of Adjacent Features | 0 | 0 | 2 - Elcho United Church & Cemetery | 2 - Elcho United Church & Cemetery | 0 | 0 |

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* This parcel option represents the final site boundary.

1. The data relating to residents presented in this table were obtained from the social survey and pertain only to those residents who responded to the survey.
2. Field staff identified buildings whose general appearance indicated that they have possible historic significance. A detailed heritage assessment of the sites and the 2km study areas was undertaken later in Phase 4A by Historica Research Limited. See Institute of Environmental Research Inc., Site Selection of a Preferred Site(s), Social Analysis. Appendices, Volume 2, Heritage Assessment, 1985.

Three possible historic buildings[1] and a recreation feature, Hunterbrook Farms, are located within the parcel option boundaries.

Twenty-one people are estimated to reside adjacent to Parcel Option 1.

## Parcel Option 2

Parcel Option 2 is located in the southeast corner of the original site boundary.

Sixteen residents are estimated to live within the boundaries of Parcel Option 2. From the survey, 2 of the residents are 65 years of age or older; no residents aged 13 years or younger were identified. All respondents own their homes. No respondent identified a household member with a leadership role in a community group. Two of the respondents on the parcel option have lived at their current address for 20 years or more. Two of the respondents have lived in Milton for 20 years or more.

Three possible historic buildings would be displaced should Parcel Option 2 be selected.

Fifty-four people are estimated to reside adjacent to Parcel Option 2.

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1. Buildings that appeared to have some historic significance were noted by field staff. A detailed heritage assessment was completed by Historica Research Limited later in Phase 4A. Despite the fact that the heritage assessment was not available at the time of site boundary refinement, the analysis for the refinement of site boundaries is not affected. The heritage assessment found all sites acceptable for development from a heritage perspective, provided appropriate mitigation was undertaken. Refer to Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 2, Heritage Assessment, 1985.

## LF3C

The site selection team identified several constraints that reduced the size of candidate site LF3C. Archeological constraints and the Beaver Creek flood plain were identified in the northwest section of the site. Furthermore, OWMC had made a commitment to avoid the Elcho United Church and Cemetery in site development. Consequently, the northwest portion of LF3C that includes Elcho United Church and Cemetery and the Beaver Creek flood plain was deleted from the potential site area.

In order to minimize the potential impacts of a larger site, several smaller land holdings were removed from the northeast portion of LF3C where it was known that these properties would not be required for the landfill and facilities development. The Beaver Creek flood plain area east of Krick Road was also removed.[1] These constraints are documented in the M.M. Dillon Ltd. Site Selection report, 1985.

The remaining portion of LF3C was divided into two parcels to facilitate comparison (see Figure 4.2).

### Parcel Option 1

Parcel Option 1 consists of the section of the original site boundary to the west of Krick Road and north to the floodplain.

Thirty-five people are estimated to reside within the parcel option boundary. From the survey, 14 of the residents are 13 years of age or younger. Three are 65 years of age or older. Sixty-seven percent of the respondents own their homes. Three of the respondents reported household members with leadership roles in community groups.

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[1] The Beaver Creek floodplain in the centre of the site was retained for site acquisition, although facilities development would not occur north of the creek.

One of the respondents within the parcel option boundary has lived at their current address 20 years or more. Four have lived in West Lincoln for more than 20 years.

Two possible historic buildings are located on Parcel Option 1.

An estimated 39 people and the Elcho United Church and Cemetery are located adjacent to the parcel.

### Parcel Option 2

Parcel Option 2 is similar to the original site acquisition boundary with the exception that the northeast corner of the site and the northwest section of the site north of the Beaver Creek flood plain are excluded from the parcel boundaries.

Parcel Option 2 would displace approximately 29 residents. From the survey, nine of the residents within the parcel option boundaries are children, 13 years of age or younger. One of the residents is a senior citizen (65 years of age or older). A majority of respondents own their homes (67%). Three of the respondents reported household members with leadership roles in community groups.

One of the survey respondents living on Parcel Option 2 has lived at their current address for 20 years or more. Three have lived in West Lincoln for 20 years or more.

Three possible historic buildings are located on Parcel Option 2.

Elcho United Church and Cemetery are located adjacent to the option as are an estimated 39 residents.

### LF1E

The site slection team identified a major hydrogeologic constraint on the south half of LF1E. This constraint is documented in the M.M. Dillon Ltd. Site Selection report, 1985. The north portion of the site remained for consideration of which either the north half of the site or the north half and a portion of the south half were suitable for facilities development. In order to undertake the social analysis, two parcels were identified (see Figure 4.3).

### Parcel Option 1

Parcel Option 1 is situated in the north half of LF1E.

Twenty-one people are estimated to reside within the boundary of Parcel Option 1. From the survey, 2 of these residents are 13 years of age or younger. Three of the residents in responding households are 65 years of age or older. Eighty-seven percent of the respondents own their homes. One of the respondents reported household members with leadership roles in community groups.

Two of the respondents living within the parcel option boundary have lived at their current address 20 years or more. Five respondents have lived in Niagara Falls for more than 19 years.

Parcel Option 1 has 5 possible historic buildings located within its boundaries.

An estimated 23 people live adjacent to this parcel option.

## Parcel Option 2

Parcel Option 2 consists of the north half of LF1E with a small section of the south portion of the original site area.

Parcel Option 2 would displace approximately 23 residents. From the survey two of the residents within the parcel option were identified as being 13 years of age or younger. Four of the residents are 65 years of age or older. A majority of respondents own their homes (89%). One of the respondents reported household members with leadership roles in community groups.

Two of the survey respondents living on Parcel Option 2 have lived at their current address for 20 years or more. Seven of the respondents have lived in Niagara Falls for 20 years or more.

Five possible historic buildings are located on Parcel Option 2.

An estimated 19 residents live adjacent to the option.

## 4.6 RANKING AND AGGREGATION OF FACTORS

The parcel options for PI1N, LF3C and LF1E were assessed on the basis of the factors, displacement of residents and displacement of community and recreation features. Where little or no difference in potential impacts was identified, off-site impacts in terms of the potential disruption of nearby residents and features were considered.[1]

No numerical ranking was assigned to the factors and indicators. The factor, displacement of residents, was considered more significant than the displacement of community and recreation features. Hardships experienced by displaced residents are considered potentially greater than those experienced by users of a community or recreation feature. Displaced residents must adapt to relocation: they must adjust to a new neighbourhood and establish new social ties. Users of a displaced community or recreation feature must look elsewhere for alternatives.

Similarly, greater weight was given to the potential disruption of adjacent residents than the potential disruption of adjacent community and recreation features.

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1. For the detailed comparative analysis of siting options, discussed in Chapter 9, the factor rankings (or weights) were revised based on inputs from the public consultation program. Application of the revised factor weights does not alter the ranking of the parcel options.

## 4.7 APPLICATION OF FACTORS: COMPARISON OF PARCEL OPTIONS

The data provided in Table 4.1 were evaluated in view of the priorities assigned to the factors. The ranking of the parcels and the rationale for the ranking are provided in the following.

### PI1N

Parcel Option 1 would be slightly less affected than Parcel Option 2 in terms of displacement of residents. Slightly fewer residents would be displaced from Parcel Option 1 and no elderly residents were identified on this parcel option as compared with two on Parcel Option 2. Parcel Option 1 has a lower percentage of homeowners than Parcel Option 2. Neither parcel option has children 13 years of age or younger. Parcel Option 1 has one household with member(s) with leadership roles in community groups while Option 2 has none. Both parcel options have the same number of respondents who have lived at their current address and in the municipality for 20 years or more.

The potential impact on community and recreation features through displacement would be slightly greater for Parcel Option 1. There are three possible historic buildings that could be displaced from each option but Hunterbrook Farms, a horseriding establishment, is located on Parcel Option 1.

Considering the potential displacement of residents and community and recreation features, there is very little difference between the two parcel options for PI1N. Parcel Option 1 would be slightly preferred over Parcel Option 2.

Because very little difference was identified between the two parcel options, the potential impacts through disruption of daily activities of residents and the operations of community and recreation features was investigated.

No community and recreation features were identified adjacent to either parcel option. The potential disruption of daily activities for residents is less for Parcel Option 1 as there are half as many adjacent residents.

These factors suggest that Parcel Option 1 could be less affected than Parcel Option 2. From a social perspective, Parcel Option 1 is preferred.

Parcel Option 2 was selected by the site selection team. Refer to the M.M. Dillon Ltd. Site Selection report, 1985 for rationale supporting this decision.

LF3C

Parcel Option 2 would be slightly less affected than Parcel Option 1. Slightly fewer residents would be displaced from Parcel Option 2. Parcel Option 2 has fewer residents 65 years of age and over and 13 years of age and under and fewer residents who have lived in the municipality for 20 years or more. The differences in all instances between Parcel Option 1 and 2, however, are small.

One more possible historic building would be displaced from Parcel Option 2 than Parcel Option 1.

Potential impact on residents through displacement was given higher priority than potential impact on community and recreation features through displacement. Parcel Option 2 is slightly preferred over Parcel Option 1.

The potential disruption of adjacent residents and community and recreation features was reviewed to obtain a clearer preference between the parcel options. As Table 4.1 indicates, however, there are no differences between the two parcel options.

Based on the above, Parcel Option 2 is slightly preferred over Parcel Option 1.

Parcel Option 2 was selected by the site selection team. Refer to M.M. Dillon Ltd. Site Selection report, 1985 for the rationale which supports this preference.

LF1E

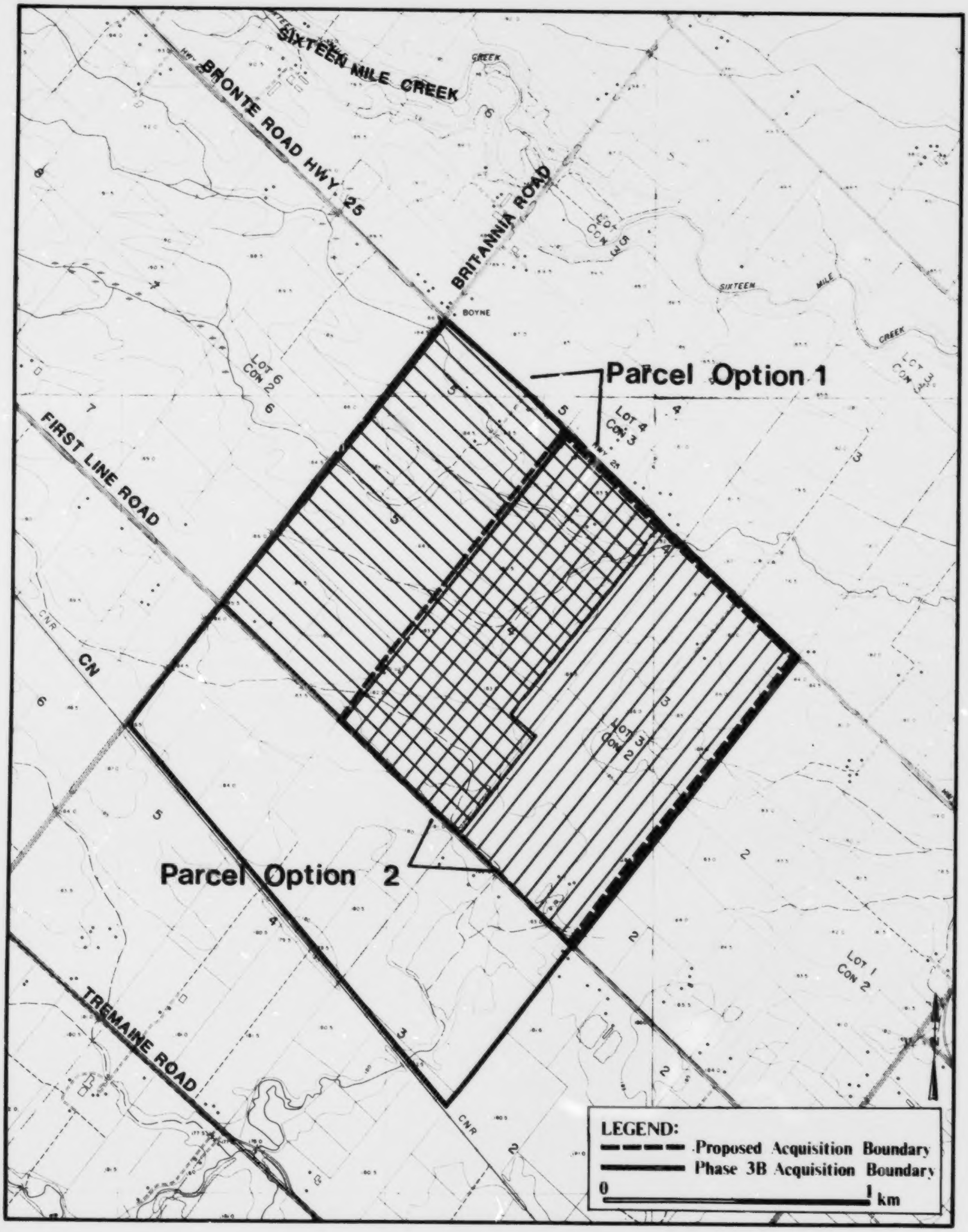
Slightly fewer residents would be displaced from Parcel Option 1 than Parcel Option 2. Parcel Option 1 has slightly fewer elderly residents and homeowners within its boundaries. The same number of residents 13 years of age or under and households with leadership roles in community groups are on Parcel Options 1 and 2. Parcel Option 1 has slightly fewer residents who have lived in the municipality for 20 years or more. The same number of residents have lived at their current address for 20 years or more.

No differences were identified between Parcel Options 1 and 2 with respect to potential displacement of community and recreation features.

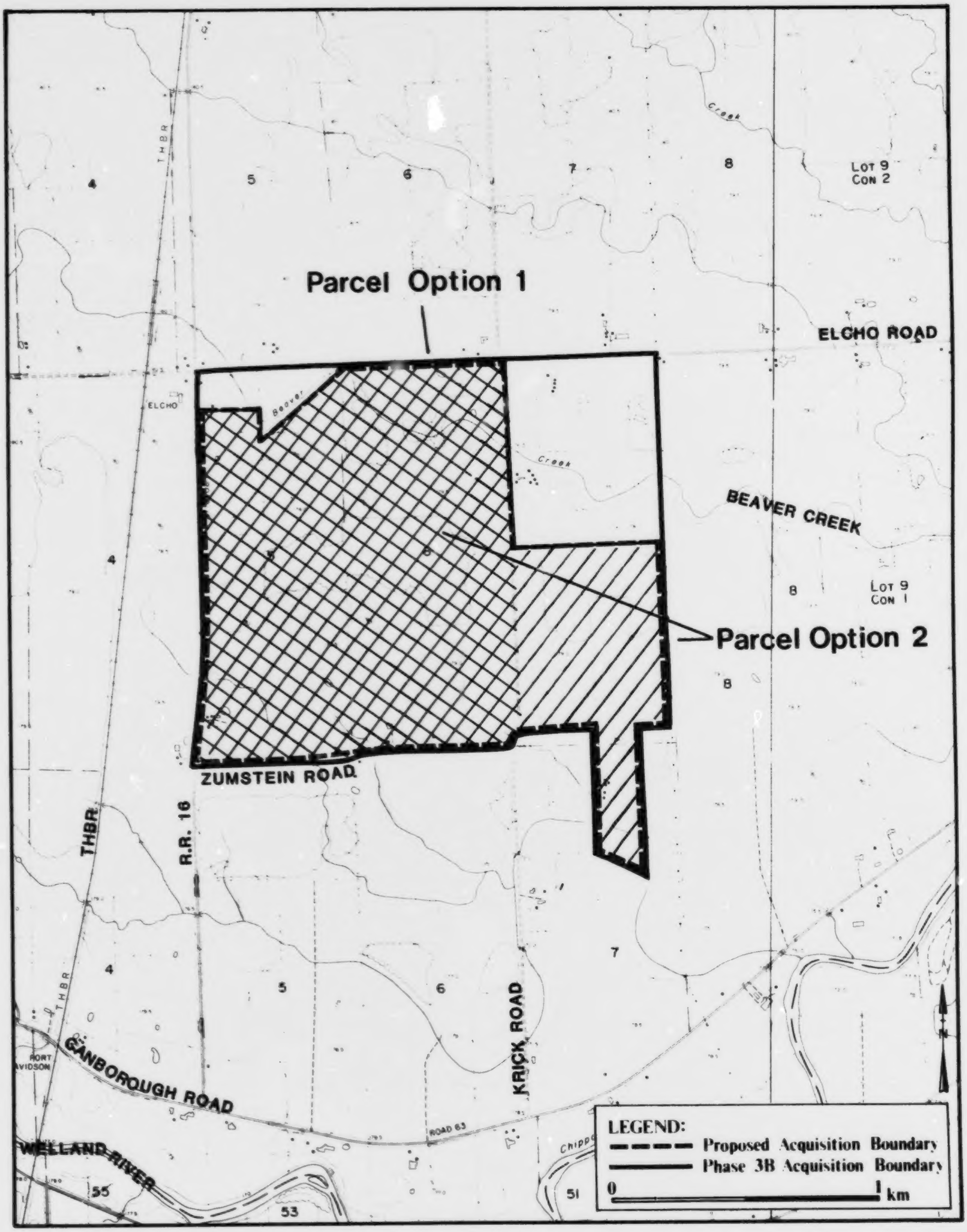
Given the above, little difference was identified between the options based on potential impacts through displacement of residents and community and recreation features. Parcel Option 1 is only slightly preferred. Potential impacts through the disruption of daily activities of adjacent residents and disruption of operations of community and recreation features were reviewed to identify a clearer preference between the parcel options.

No community and recreation features were identified adjacent to Parcel Option 1 or 2. Slightly fewer residents live adjacent to Parcel Option 2. The difference, however, is small (19 residents adjacent to Parcel Option 2 as compared to 23 residents adjacent to Parcel Option 1). Consideration of potential impacts on, and adjacent to, Parcel Options 1 and 2, reveals no clear preference. Based on this relative comparison, either parcel option would be acceptable from a social perspective.

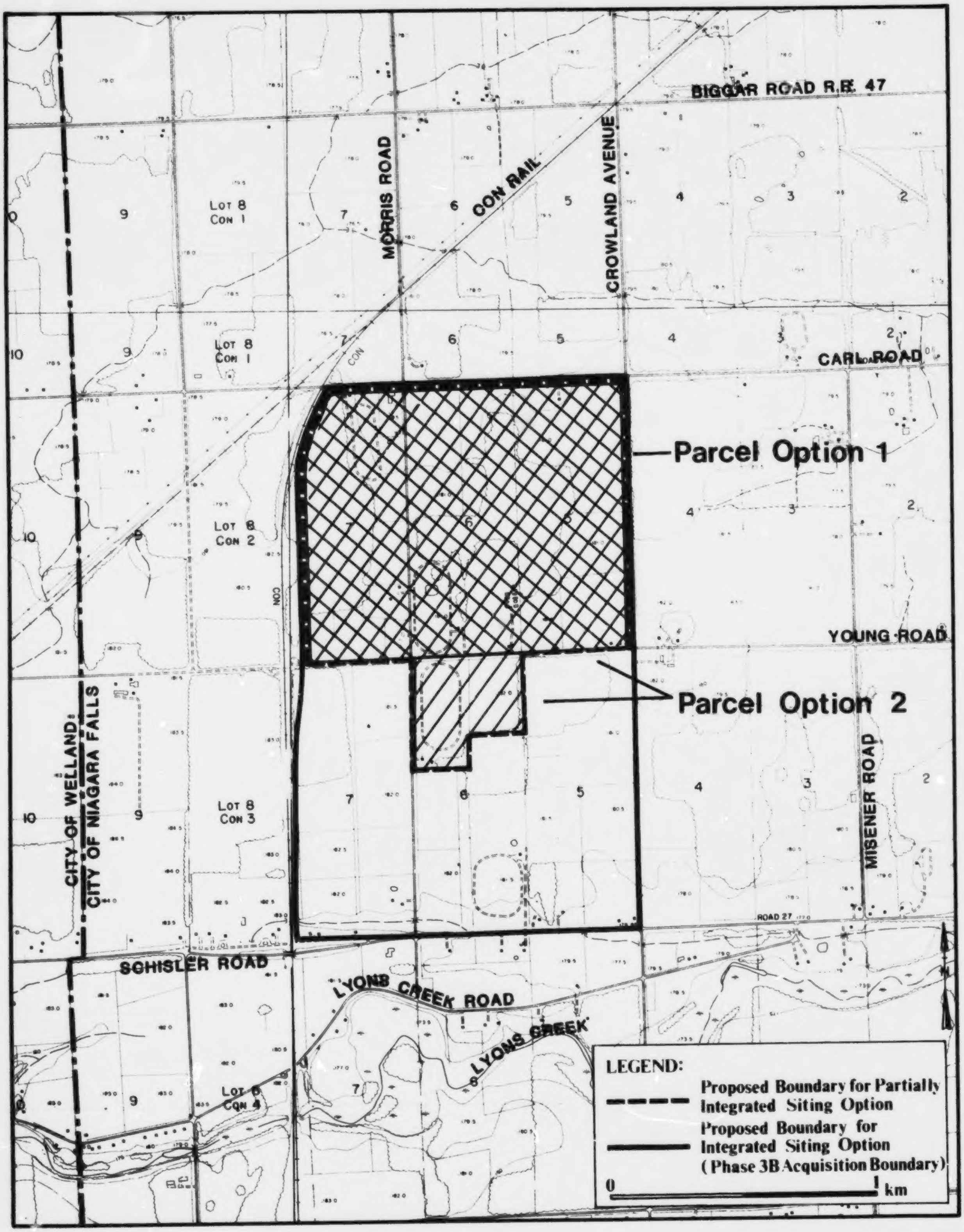
Parcel Option 2 was selected by the site selection team. Refer to the M.M. Dillon Ltd. Site Selection report, 1985 for the rationale supporting this preference.


SIXTEEN MILE CREEK
BRONTE ROAD HWY. 25
BRITANNIA ROAD
BOYNE
LOT 5 CON 3
SIXTEEN MILE CREEK
LOT 6 CON 2
Parcel Option 1
LOT 4 CON 3
LOT 3 CON 3
FIRST LINE ROAD
CNR
CN
LOT 3 CON 2
Parcel Option 2
LOT 1 CON 2
TREMAINE ROAD
CNR
LEGEND:
Proposed Acquisition Boundary
Phase 3B Acquisition Boundary
0
1 km

PI-1N
REFINEMENT OF SITE BOUNDARIES
FIGURE 4.1


Parcel Option 1
Parcel Option 2
ELCHO ROAD
ELCHO
Beaver
Creek
BEAVER CREEK
LOT 9
CON 2
LOT 9
CON 1
ZUMSTEIN ROAD
THBR
R.R. 16
KRICK ROAD
GAINBOROUGH ROAD
ROAD 63
WELLAND RIVER
PORT
AVIDSON
Chippa
4
5
6
7
8
55
53
51
LEGEND:
Proposed Acquisition Boundary
Phase 3B Acquisition Boundary
0
1 km
N

**LF-3C**
**REFINEMENT OF SITE BOUNDARIES**
**FIGURE 4.2**


BIGGAR ROAD R.R. 47
MORRIS ROAD
CON RAIL
CROWLAND AVENUE
CON
CARL ROAD
YOUNG ROAD
MISENER ROAD
ROAD 27
Parcel Option 1
Parcel Option 2
Lot 8
Con 1
Lot 8
Con 1
Lot 8
Con 2
Lot 8
Con 3
Lot 8
Con 4
CITY OF WELLAND
CITY OF NIAGARA FALLS
SCHISLER ROAD
LYONS CREEK ROAD
LYONS CREEK
LEGEND:
Proposed Boundary for Partially Integrated Siting Option
Proposed Boundary for Integrated Siting Option (Phase 3B Acquisition Boundary)
0
1 km

LF-1E

REFINEMENT OF SITE BOUNDARIES

FIGURE 4.3

# CHAPTER 5

# RAIL ACCESS OPTIONS

## 5.1 INTRODUCTION

The potential for rail access to each of the candidate sites was investigated by the site selection team. This chapter documents the social analysis undertaken to contribute to the selection of a preferred rail access option for the candidate sites.

## 5.2 STUDY APPROACH AND ASSUMPTIONS

Rail access would provide an alternative means of hauling process additives and reagents to a candidate site. It is viewed as an opportunity rather than as a requirement for an acceptable siting option. Therefore, the lack of rail access to a site would not necessitate the rejection of the site. Further information on rail access is documented in M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Transportation, 1985.

*Opportunities for rail access were investigated in two steps: constraint mapping and comparative evaluation. A number of preliminary spur line options were provided by the transportation and engineering consultants (M.M. Dillon Ltd. and Monenco Limited). These options were initially evaluated using a constraint mapping exercise at a scale of 1:10,000. Several options were eliminated, while others were added or adjusted.[1] The rail access options remaining after this step underwent a comparative evaluation, again at a scale of 1:10,000.*

*As the potential impacts on residents and community and recreation features located on-site were to be considered during the comparative evaluation of the siting options, only off-site impacts were addressed for the social analysis of the rail access options. The study area considered, therefore, terminated at the site acquisition boundary.*

*A number of social considerations guided the development of assumptions and factors for the analysis of the rail options. These considerations relate to OWMC's goal to minimize environmental impacts.*

*The construction of a spur line to an OWMC facility could result in the displacement of existing residences and community and recreation features. The use of the spur line could interfere with residents' use and enjoyment of their properties or the operation of community and recreation features. Consequently, consideration was given to the potential for displacement or disruption of residents and community and recreation features.*

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[1] *See M.M. Dillon Ltd., Site Selection Process, Phase 4a: Selection of a Preferred Site(s), Site Selection, 1985 for a discussion of the constraint mapping exercise.*

The following assumption was adopted for the analysis:

- rail movements will occur any time during a twenty-four hour, seven day schedule.[1]

Residences and community and recreation features within the defined rail access corridors were mapped for constraint mapping. All residences located on properties crossed by a rail access option were identified.

These data, along with data of the other site selection team members were used to identify rail access options which had sufficient constraints to warrant elimination. These options were not retained for comparative evaluation. In some instances, new options were identified and in others, options were adjusted to avoid constraints.

The rail access options remaining after constraint mapping underwent a comparative evaluation. For comparative evaluation, two impact zones were utilized. These impact zones are discussed below.[2]

### 170 Metre Impact Zone

A preliminary analysis was undertaken by the transportation consultants, M.M. Dillon Ltd., to define an impact area relating to potential noise effects of a rail spurline. The analysis was based on the average number of rail car loadings per day and per week and rail operating speed.

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[1] See M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Transportation, 1985.

[2] Refer to the M.M. Dillon Ltd., Transportation report, 1985, for further details on the derivation of these impact zones.

The 170 metre impact zone on each side of a rail spur line represents the area within which the maximum noise impacts could be expected to occur. This impact zone was used to identify residents and features potentially affected by an increase in sound levels.

### 250 Metre Impact Zone

A 250 metre impact zone on each side of a rail spur line was also used. The 250 metre impact zone is based on a Transport Canada Study of the Mississauga train derailment. This zone represents the area on each side of a rail line outside of which the impact of short-range events, such as explosions or fires are expected to be minimal. This zone, therefore, was used to identify residents and features potentially disrupted due to evacuation in the event of an accident.

Features and dwellings within the 170 metre and 250 metre impact zones and those that would be displaced were mapped. The population potentially displaced or disrupted was estimated. The options were reviewed to identify those preferred from the social perspective.

## 5.3 IDENTIFICATION OF FACTORS AND INDICATORS

As discussed in Section 5.2, the main social considerations were the potential for displacement of residents and community and recreation features. Also of concern was the potential for the disruption of residents, and disruption of the operations of community and recreation features.

Different factors were applied during the constraint mapping and comparative evaluation exercises to address these considerations. These factors and their indicators are noted below and described in Appendix A, Factor Sheets.

## CONSTRAINT MAPPING

The following factors and indicators were used during constraint mapping to assist in the identification of alternative rail access options.

Estimated Population:

- dwelling counts (from Leon Kentridge Associates Ltd.)
- average household size (1981 Census)

The construction of a rail spur line to an OWMC facility could result in the displacement of residents. The use of a rail spur line could affect the normal use and enjoyment of residential properties. The indicators, dwelling counts (from Leon Kentridge Associates Ltd.) and average household size (1981 Census) were multiplied to estimate the population. Estimated population was used in constraint mapping to assist in identifying the rail access options that would minimize the number of residents displaced or disrupted.

Community and Recreation Features

- number and type of community and recreation features

The construction of a rail spur line could result in the displacement of community and recreation features. The use of a rail spur line could disrupt the operations of features in the vicinity of a spur line. The indicator, number and type of community and recreation features, was used in constraint mapping to minimize the number of features displaced and/or disrupted.

## COMPARATIVE EVALUATION

The alternative rail access options identified through the constraint mapping exercise were subjected to a more detailed comparative evaluation to recommend a preferred rail access option. The following factors and indicators were used. Additional information on these factors and indicators are provided in Appendix A, Factor Sheets.

### *Impacts on Residents*

- *Displacement:*

  *The construction of a rail spur line to an OWMC facility could result in the displacement of residents. This factor was designed to reflect the potential hardships which would be experienced by displaced residents. The indicator, number of residents, was used as a quantitative measure of potential impact through displacement.*

- *Disruption of day-to-day activities and/or the use and enjoyment of property:*

  *It was anticipated that the use of a rail spur line would disrupt the activities and property uses of residents in the vicinity. Disruptions could include increased noise and nuisance experienced if residents are required to evacuate in the event of an accident. This factor reflects the potential disruptions that would be experienced by residents in the vicinity of a rail spur line. The indicator, number of residents within the 170 metre impact zone, provides a quantitative measure of potential disruption due to noise. The number of residents within the 250 metre impact zone provides a measure of nuisance experienced by residents in the event of evacuation.*

*Dwelling counts (from Leon Kentridge Associates Ltd.) and average household size (1981 Census) were multiplied to estimate the population potentially displaced and disrupted.*

### *Impact on Community and Recreation Features*

- *Displacement:*

  *The construction of a rail spur line could result in the displacement of community and recreation features. This factor reflects the potential hardships experienced by the clients and community due to the displacement of such features.*

  *The number of community and recreation features displaced provided a quantitative measure of impact. The underlying assumption was that potential adverse effects of displacement for both users and the community required to supply alternatives would increase in proportion to the number of features displaced.*

- *Disruption of Operations:*

  *It was anticipated that the use of a rail spur line would disrupt the operations of community and recreation features in the vicinity of the spur line. Disruption could occur through noise or nuisance experienced if required to evacuate in the event of an accident. Such effects could result in loss of operational effectiveness or perceived image and, possibly, user demand. This factor was designed to reflect the potential disruptions that features in the vicinity of the rail spur line might experience. The number of features within the 170 metre impact zone provides a quantitative comparable measure of potential impact through increased noise. The number of features within the 250 metre impact zone provides a measure of potential nuisance in the event of evacuation.*

*Other impacts which could be associated with a rail spur line include visual intrusion, concern for children's safety and a negative effect on an area's image. Perceptual impacts might also be associated with the potential risk to one's health in the event of a rail accident. Stress from such a concern or that for children's safety might also be experienced by nearby residents. While these potential impacts were acknowledged, they were not investigated for the analysis of rail access options. Given the level of detail applied for this analysis it was felt that an investigation of these additional impacts was not warranted. Rather, it was assumed that by attempting to minimize the number of residents and community and recreation features that could be displaced or disrupted, potential impacts such as those noted above would be minimized.*

## 5.4 DATA COLLECTION

The following data sources and data were applicable to the analysis of the rail access options,[1]

- data gathered through field investigations: the field investigations provided the location of community and recreation features
- data from secondary sources: residential population was estimated through the use of average municipal household size, obtained from the 1981 Census. The average household size for the municipality in which a rail access option is located was applied to dwelling counts provided by Leon Kentridge Associates to estimate the number of residents.

As only off-site impacts were considered, data collection for all indicators terminated at the site acquisition boundaries.

## 5.5 ANALYSIS

Table 5.1 provides the data by factor and indicator used to compare the rail access options. Figures 5.1 to 5.6, at the end of this Chapter, identify the rail access options. Each rail access option is described below.

### PI13N and LF2N

The site selection study team identified a number of major constraints associated with the provision of rail service to PI13N and LF2N. Therefore, rail service was not considered as an opportunity at these two sites and no rail access options were identified. A discussion of the constraints to rail access opportunities for PI13N and LF2N is documented in M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Site Selection, 1985.

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[1] Refer to Chapter 3.0, Data Collection and Analysis, for a discussion of the data collection process.

### TABLE 5.1
### RAIL ACCESS OPTIONS
### SITE PI1N

| FACTORS | OPTIONS (i) | (ii) | (iii) | (iv) |
|---|---|---|---|---|
| Impact on Residents | | | | |
| • Displacement | | | | |
| - Number of residents displaced | 0 | 0 | 0 | 0 |
| • Disruption of Day-to-Day Activities and Use and Enjoyment of Property | | | | |
| - Number of Residents Within 170m Impact Zone | 0 | 0 | 4 | 4 |
| - Number of Residents Within 250m Impact Zone[1] | 0 | 0 | 7 | 7 |
| Impact on Community and Recreation Features | | | | |
| • Displacement | | | | |
| - Number of community and recreation features displaced | 0 | 0 | 0 | 0 |
| • Disruption of Operations | | | | |
| - 170m impact zone | 0 | 0 | 0 | 0 |
| - 250m impact zone | 0 | 0 | 0 | 0 |

---

[1] These figures include the residents within the 170 metre impact zone.

## *TABLE 5.1*
## *RAIL ACCESS OPTIONS*
## *SITE LF4N*

| *FACTORS* | *OPTIONS* (i) | (ii) | (iii) | (iv) |
|---|---|---|---|---|
| *Impact on Residents* | | | | |
| • *Displacement* | | | | |
| - *Number of residents displaced* | 0 | 0 | 0 | 0 |
| • *Disruption of Day-to-Day Activities and Use and Enjoyment of Property* | | | | |
| - *Number of Residents Within 170m Impact Zone* | 0 | 0 | 4 | 0 |
| - *Number of Residents Within 250m Impact Zone*[1] | 0 | 0 | 4 | 0 |
| *Impact on Community and Recreation Features* | | | | |
| • *Displacement* | | | | |
| - *Number of community and recreation features displaced* | 0 | 0 | 0 | 0 |
| • *Disruption of Operations* | | | | |
| - *170m impact zone* | 0 | 0 | 0 | 0 |
| - *250m impact zone* | 0 | 0 | 0 | 0 |

## TABLE 5.1
## RAIL ACCESS OPTIONS
## SITE LF3C

| FACTORS | OPTIONS (i) | (ii) | (iii) |
|---|---|---|---|
| Impact on Residents | | | |
| • Displacement<br>- Number of residents displaced | 0 | 0 | 0 |
| • Disruption of Day-to-Day Activities and Use and Enjoyment of Property<br>- Number of Residents Within 170m Impact Zone | 0 | 0 | 7 |
| - Number of Residents Within 250m Impact Zone[1] | 0 | 0 | 18 |
| Impact on Community and Recreation Features | | | |
| • Displacement<br>- Number of community and recreation features displaced | 0 | 0 | 0 |
| • Disruption of Operations<br>- 170m impact zone | 0 | 0 | Elcho United Church and Cemetery |
| - 250m impact zone | 0 | 0 | Elcho United Church and Cemetery |

## TABLE 5.1
## RAIL ACCESS OPTIONS
## SITE LF9C

| FACTORS | OPTIONS (i) | (ii) | (iii) | (iv) | (v) |
|---|---|---|---|---|---|
| Impact on Residents | | | | | |
| • Displacement<br>- Number of residents displaced | 0 | 4 | 0 | 0 | 0 |
| • Disruption of Day-to-Day Activities and Use and Enjoyment of Property<br>- Number of Residents Within 170m Impact Zone | 14 | 11 | 32 | 0 | 7 |
| - Number of Residents Within 250m Impact Zone[1] | 18 | 32 | 35 | 4 | 11 |
| Impact on Community and Recreation Features | | | | | |
| • Displacement<br>- Number of community and recreation features displaced | 0 | 0 | Possible Historic Building[2] | 0 | 0 |
| • Disruption of Operations<br>- 170m Impact Zone | 0 | 0 | Brethren in Christ Church | 0 | 0 |
| - 250m Impact Zone | 0 | 0 | Brethren in Christ Church | 0 | 0 |

---

[2] Field staff identified this building which, by its general appearance, could be historic.

## TABLE 5.1
## RAIL ACCESS OPTIONS
## SITE LF1E

| FACTORS | OPTIONS[3] | | |
|---|---|---|---|
| | (i) | (ii) | (iii) |
| Impact on Residents | | | |
| • Displacement<br>- Number of residents displaced | 0 | 0 | 0 |
| • Disruption of Day-to-Day Activities and Use and Enjoyment of Property<br>- Number of Residents Within 170m Impact Zone | 0 | 3 | 0 |
| - Number of Residents Within 250m Impact Zone[1] | 0 | 3 | 0 |
| Impact on Community and Recreation Features | | | |
| • Displacement<br>- Number of community and recreation features displaced | 0 | 0 | 0 |
| • Disruption of Operations<br>- 170m impact zone | 0 | 0 | 0 |
| - 250m impact zone | 0 | 0 | 0 |

---

[3] Option 4 was eliminated following site boundary refinement for LF1E as it no longer provided suitable access.

### PI1N

Four rail access options were identified for PI1N. No option would displace residents or community and recreation features. Options 1 and 4 have an estimated 4 residents within the 170 metre impact zone and another 3 residents within 250 metres of the rail access options. Hunterbrook Farms (riding stables) would be potentially disrupted by Option 1 as it is located within the impact zones.

No residents or features were identified within the 170 metre and 250 metre impact zones of Options 1 and 2.

### LF4N

Four rail access options were reviewed. Options 1, 2 and 4 would not displace any residents or community and recreation features and no residents or features were identified within the 170 metre and 250 metre impact zones. Option 3 would disrupt 4 residents living within the 170 metre impact zone.

### LF3C

Three rail access options to LF3C were reviewed. Options 1 and 2 would not displace any residents or community and recreation features. No residents or features are located within the 170 and 250 metre impact zones.

While no community and recreation features or residents would be displaced by Option 3, approximately 7 residents are located within 170 metres of the option and an additional eleven residents are located within the 250 metre impact zone. Elcho United Church and Cemetery are located within 170 metres of Option 3. The small population concentration of Elcho is situated within the 250 metre impact zone; residents of Elcho are included in the estimated population within 250 metres of Option 3.

LF9C

Five rail access options were compared for LF9C. Approximately 14 residents are located within the 170 metre impact zone and another 4 residents within 250 metres of Option 1. No residents or community and recreation features would be displaced. No community and recreation features were identified as being potentially disrupted.

Option 2 would displace an estimated 4 residents. Approximately 11 residents were identified within the 170 metre impact zone and another 21 residents within the 250 metre impact zone. No features were identified as being potentially displaced or disrupted.

No residents would be displaced by Option 3. An estimated 32 residents are located within the 170 metre impact zone and another 3 residents within the 250 metre impact zone. A possible historic[1] building would be displaced by this option. The Brethren in Christ Church is located within the 170 metre impact zone and the 250 metre impact zone.

---

[1] Field staff identified this feature as having possible historic significance based on its general appearance. This historic significance of this feature was investigated later in Phase 4A by Historica Research Limited. The findings of the heritage assessment indicated that no features were of such significance that they should prohibit the development of the OWMC facilities provided that appropriate mitigative measures were taken. Refer to Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 2 - Heritage Assessment, 1985.

Options 4 and 5 would not displace any residents or community and recreation features. Approximately 4 residents are located within the 250 metre impact zone of Option 4. An estimated 7 residents are located within the 170 metre impact zone of Option 5 with an additional 4 residents in the 250 metre impact zone. No features are located within the impact zones for these options.

### LF1E

Four rail access options were reviewed for LF1E. Options 1 and 3 would not displace any residents or community and recreation features. There were no residents or features identified in the impact zones. Approximately 3 residents are located within the 170 metre impact zone of Option 2.

Option 4 is located entirely on-site, extending eastward from the existing rail line.[1] It was assumed that little impact would be felt off-site over and above the impacts of the existing rail line.

### PI27E

The rail access option for PI27E is the existing ConRail line which traverses diagonally across the site. Since no spur line would have to be constructed to connect the site with a rail line, no analysis was undertaken of off-site impacts.

## 5.6 RANKING AND AGGREGATION OF FACTORS

The rail access options were assessed on the basis of the potential displacement of residents, potential displacement of community and recreation features, disruption of the use and enjoyment of residential properties, and disruption of operations of community and recreation features. No numerical weighting was assigned to these factors and indicators. However, higher priority was given to some factors and indicators when comparing the rail access options. The priorities assigned are shown in Table 5.2.

---

[1] Option 4 was eliminated following site boundary refinement for LF1E as it no longer provided suitable access.

Research indicates that the disruption experienced by residents displaced for new developments such as highways is generally greater than the disruption created for residents left behind.[1] The potential impacts associated with the construction and use of a rail spur line are considered similar to those of highway development, including increased sound levels and displacement of residents and community and recreation features. For this reason, the displacement of residents was given higher priority than the disruption of residents.[2] The displacement of community and recreation features is judged to be less important than the displacement or disruption of residents and consequently is given lower priority. Displacement of community and recreation features for a rail spur line would generally have a greater impact than the disruption created for those features remaining nearby. For this reason, community and recreation features in the 170m and 250m impact zones are given lower priority than those features which could be displaced.

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[1] K. Finsterbusch, A Methodology for Social Impact Assessment of Highway Locations. Interim Report. (Department of Sociology, University of Maryland: July, 1976).
K. Finsterbusch, Understanding Social Impacts: Assessing the Effects of Public Projects. (Beverly Hills, Ca: Sage Publications, 1980.)
M. Fried, "Grieving for a Lost Home." Duhl, L.J. (Ed.) The Urban Condition. (New York: Basic Books, 1963.)

[2] For the detailed comparative analysis of siting options, discussed in Chapter 9, the factor weights were revised based on inputs from the public consultation program and more weight was given to the disruption of residents than to displacement. Application of these revised factor weights does not alter the ranking of the rail access options.

### TABLE 5.2
### RAIL ACCESS OPTIONS
### FACTOR AND INDICATOR WEIGHTING

| FACTOR | INDICATOR | PRIORITY |
|---|---|---|
| Impact on Residents | | |
| Displacement | • Number of Residents Displaced | High Priority |
| Disruption of Day-to-Day Activities and/or Use and Enjoyment of Property | • Number of Residents Within 170m Impact Zone | ↑ |
| | • Number of Residents Within 250m Impact Zone | |
| Impact on Community and Recreation Features | | |
| Displacement | • Number of Community and Recreation Features | |
| Disruption of Operations | • Number of Community and Recreation Features Within 170m Impact Zone | ↓ |
| | • Number of Community and Recreation Features Within 250m Impact Zone | Low Priority |

Residents and community and recreation features located within the 170 metre impact zone were assigned higher priority than those within the 250 metre impact zone. The potential exists for all residents and community and recreation features within the 170 metre impact zone to experience the nuisance effects of noise on a regular basis. Residents and features in closer proximity to the rail line would also be more likely to be exposed to other potential nuisances. Residents and features beyond the 170 metre impact zone but within the 250 metre impact zone could experience the potential nuisance of evacuation but would probably not be as exposed to other nuisances.

## 5.7 APPLICATION OF FACTORS: COMPARATIVE EVALUATION

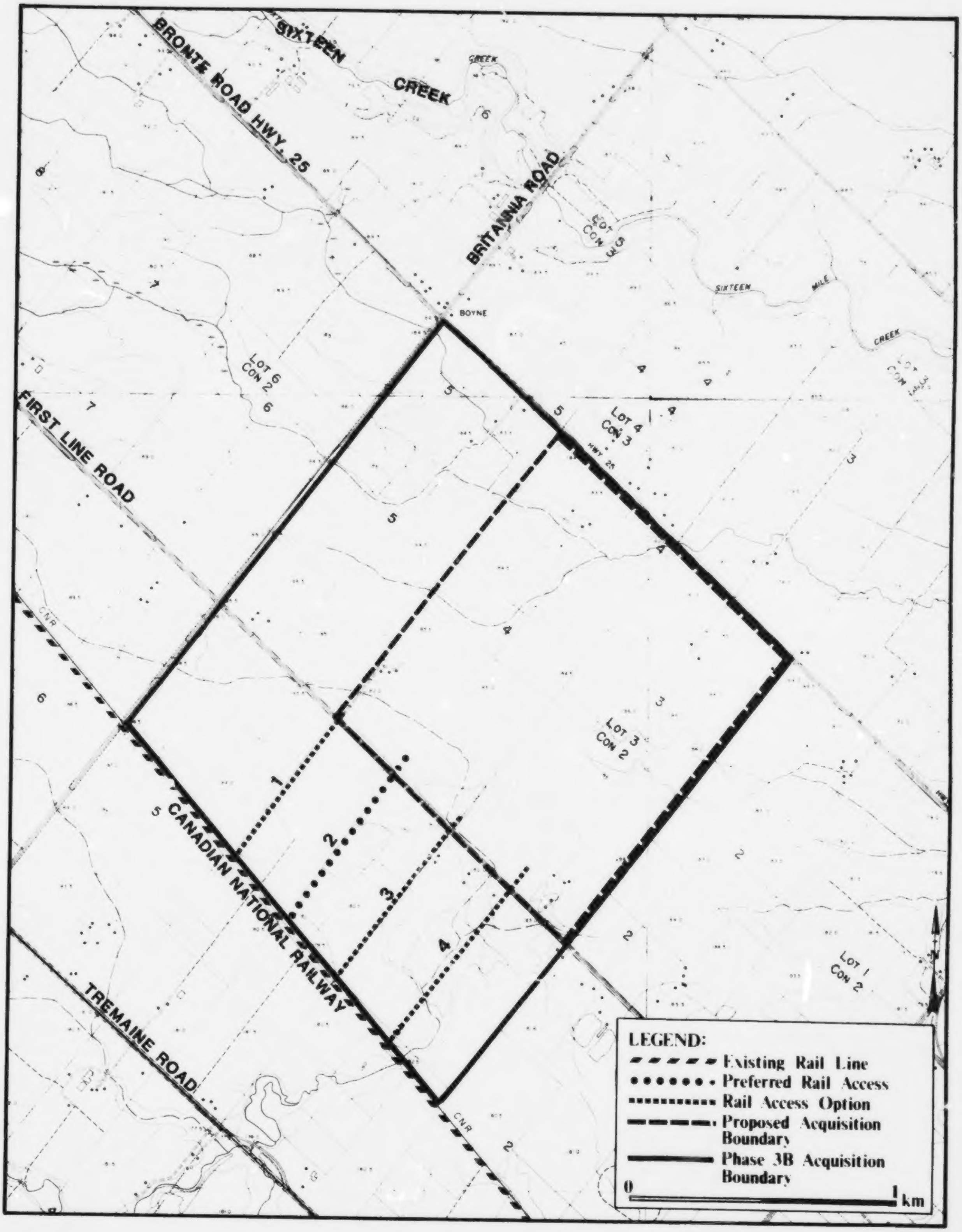
The data in Table 5.1 were evaluated in view of the priorities assigned to the factors and indicators. Table 5.3 provides the ranking of the rail access options, the rationale for the ranking and the preferred rail access option(s).

The ranking of the rail access options in Table 5.3 was used in conjunction with the rankings completed by the other members of the site selection team to identify a preferred rail access option for each site. The rail access options selected by the site selection team are documented in the M.M. Dillon Ltd., Site Selection Report, 1985.

# TABLE 5.3
## RAIL ACCESS OPTIONS
## RANKING OF RAIL ACCESS OPTIONS

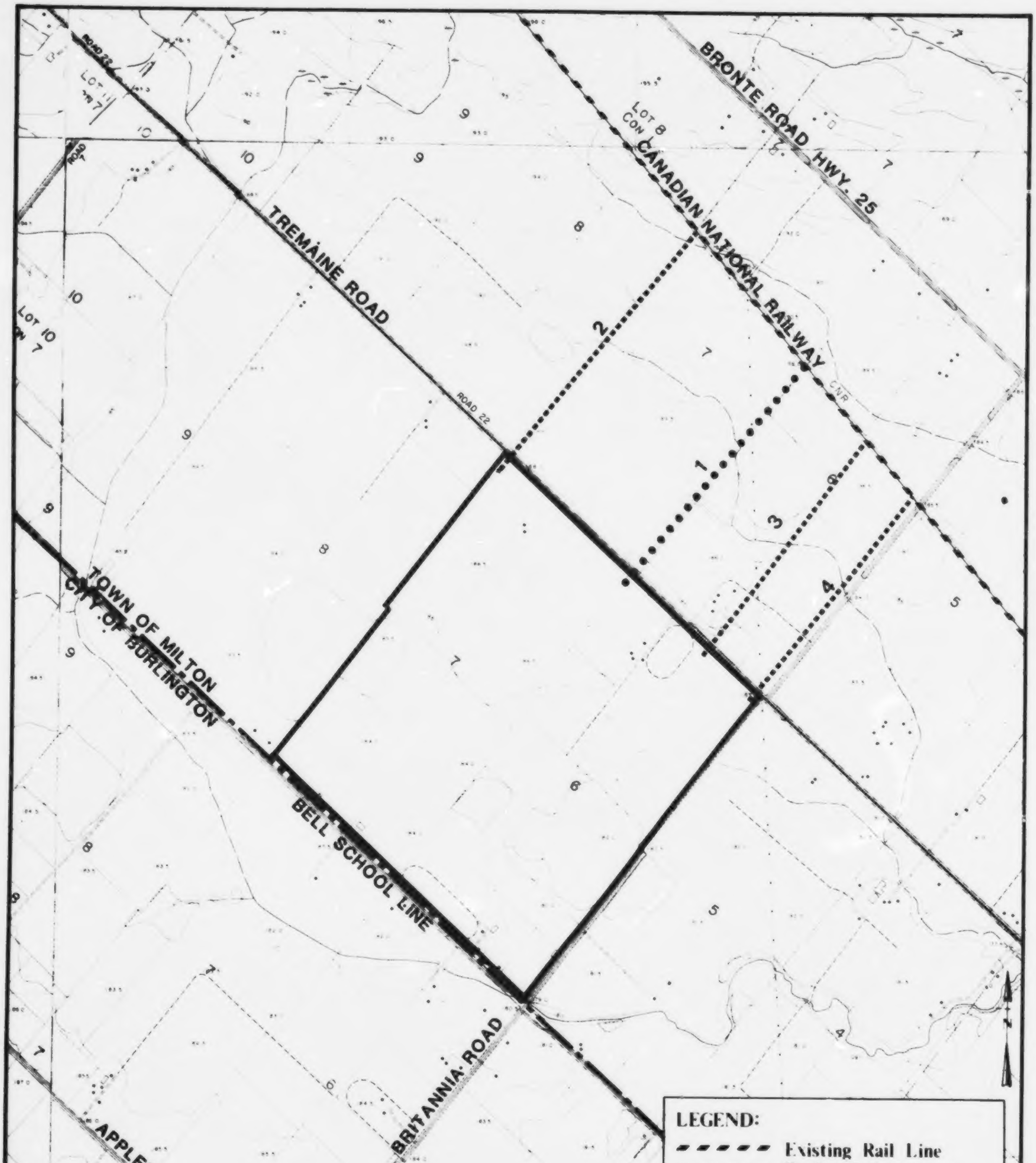
| SITE | RAIL ACCESS OPTION | RANKING | RATIONALE |
|---|---|---|---|
| PI1N | 1 | 1 | • No potential impacts were identified for Options 1 and 2; these options are preferred.<br>• Option 3 and 4 would potentially disrupt the same number of residents in the 170m and 250m impact zones. Options 3 and 4 are less preferred than Options 1 and 2. |
| | 2 | 1 | |
| | 3 | 4 | |
| | 4 | 4 | |
| LF4N | 1 | 1 | • No potential impacts were identified for Options 1, 2 and 4. These options are the preferred rail access options.<br>• Potential impacts were identified for Option 3; an estimated 4 residents are within the 170 impact zone. |
| | 2 | 1 | |
| | 3 | 4 | |
| | 4 | 1 | |
| LF3C | 1 | 1 | • No impacts were identified for Options 1 and 2. These options are the preferred rail access options.<br>• An estimated 7 residents are located within the 170m impact zone and an additional 11 residents within the 250m impact zone of Option 3. Elcho United Church and Cemetery are located within the 170m impact zone. With these potential impacts, Option 3 is the least preferred. |
| | 2 | 1 | |
| | 3 | 3 | |
| LF9C | 1 | 3 | • An estimated 4 residents were noted within the 250m impact zone of Option 4. With the lowest number of residents and no features potentially impacted, Option 4 would have the least impact and is the preferred rail access option.<br>• Option 5 would have a somewhat greater impact than Option 4 with 7 residents estimated in the 170m impact zone and an additional 4 residents in the 250m impact zone.<br>• Option 1 would have a somewhat greater impact than Option 5 with 18 residents estimated in the 250m impact zone of which 14 residents are in the 170m impact zone.<br>• Option 2 would displace 4 residents and potentially disrupt 32 residents. Option 3 would potentially disrupt 35 residents. Option 3 would also potentially displace a possible historic building and disrupt a church located in the 170m impact zone. Options 2 and 3 would have the greatest impact and are the least preferred options. |
| | 2 | 5 | |
| | 3 | 5 | |
| | 4 | 1 | |
| | 5 | 2 | |
| LF1E | 1 | 1 | • No potential impacts were identified for Options 1 and 3. These options are preferred.<br>• Option 2 would potentially disrupt 3 residents and is the least preferred rail access option for LF1E. |
| | 2 | 3 | |
| | 3 | 1 | |

1) Ranking: 1 - Preferred option.
2) This analysis and ranking compares the rail access options for each candidate site. It does not compare the rail access options of a candidate site with those of other candidate sites.


SIXTEEN
CREEK
BRONTE ROAD HWY. 25
BRITANNIA ROAD
BOYNE
SIXTEEN MILE CREEK
LOT 6 CON 2
LOT 4 CON 3
HWY 25
FIRST LINE ROAD
CNR
LOT 3 CON 2
1
2
3
4
CANADIAN NATIONAL RAILWAY
TREMAINE ROAD
LOT 1 CON 2
N
LEGEND:
Existing Rail Line
Preferred Rail Access
Rail Access Option
Proposed Acquisition Boundary
Phase 3B Acquisition Boundary
0
1 km

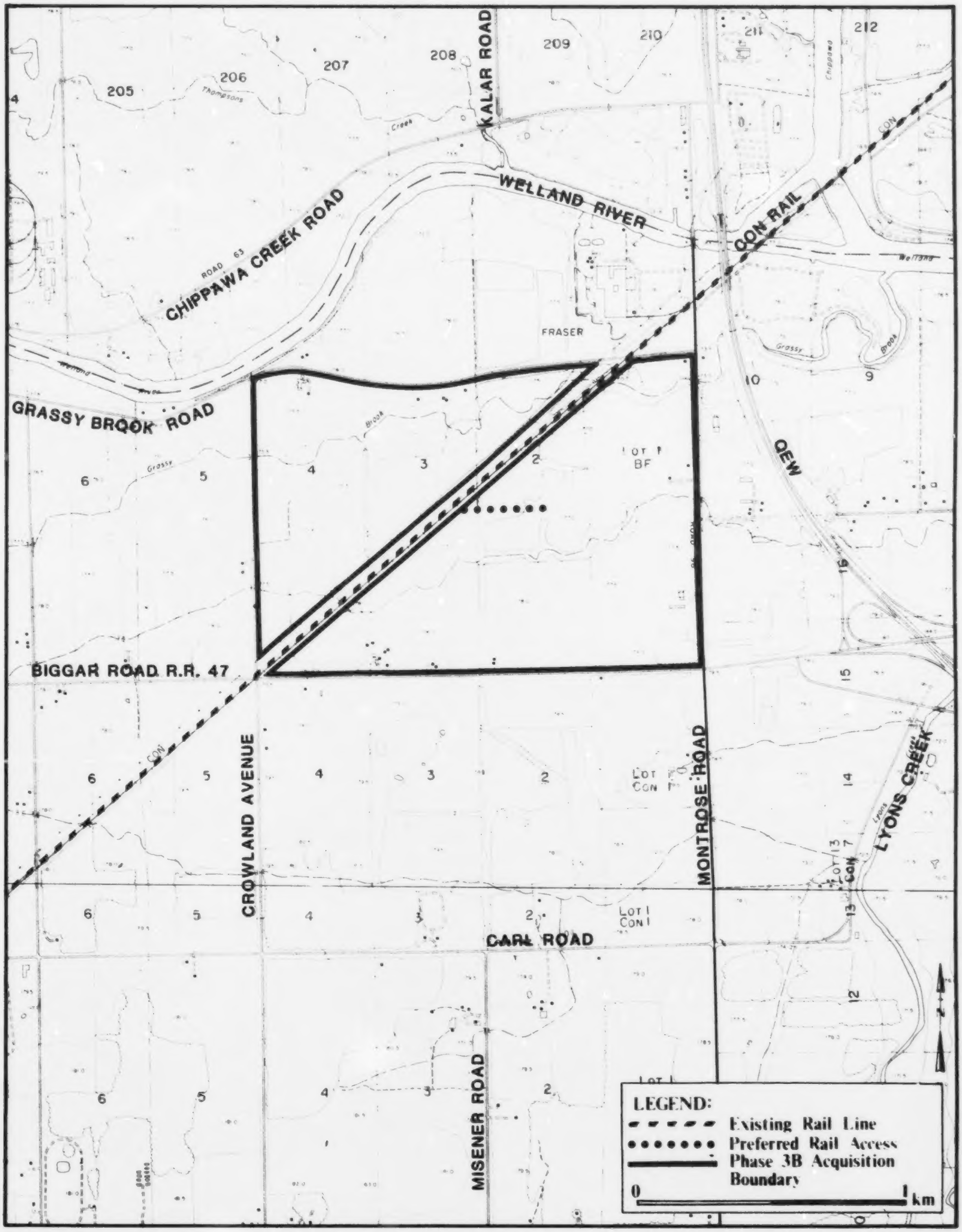
**PI-1N**
**RAIL ACCESS**

**FIGURE 5.1**


BRONTE ROAD HWY. 25
CANADIAN NATIONAL RAILWAY
CNR
LOT 8 CON
TREMAINE ROAD
ROAD 22
LOT 10 CON 7
LOT 11 CON 7
TOWN OF MILTON
CITY OF BURLINGTON
BELL SCHOOL LINE
BRITANNIA ROAD
APPLEBY LINE
1
2
3
4
LEGEND:
Existing Rail Line
Preferred Rail Access
Rail Access Option
Phase 3B Acquisition Boundary
0
1 km

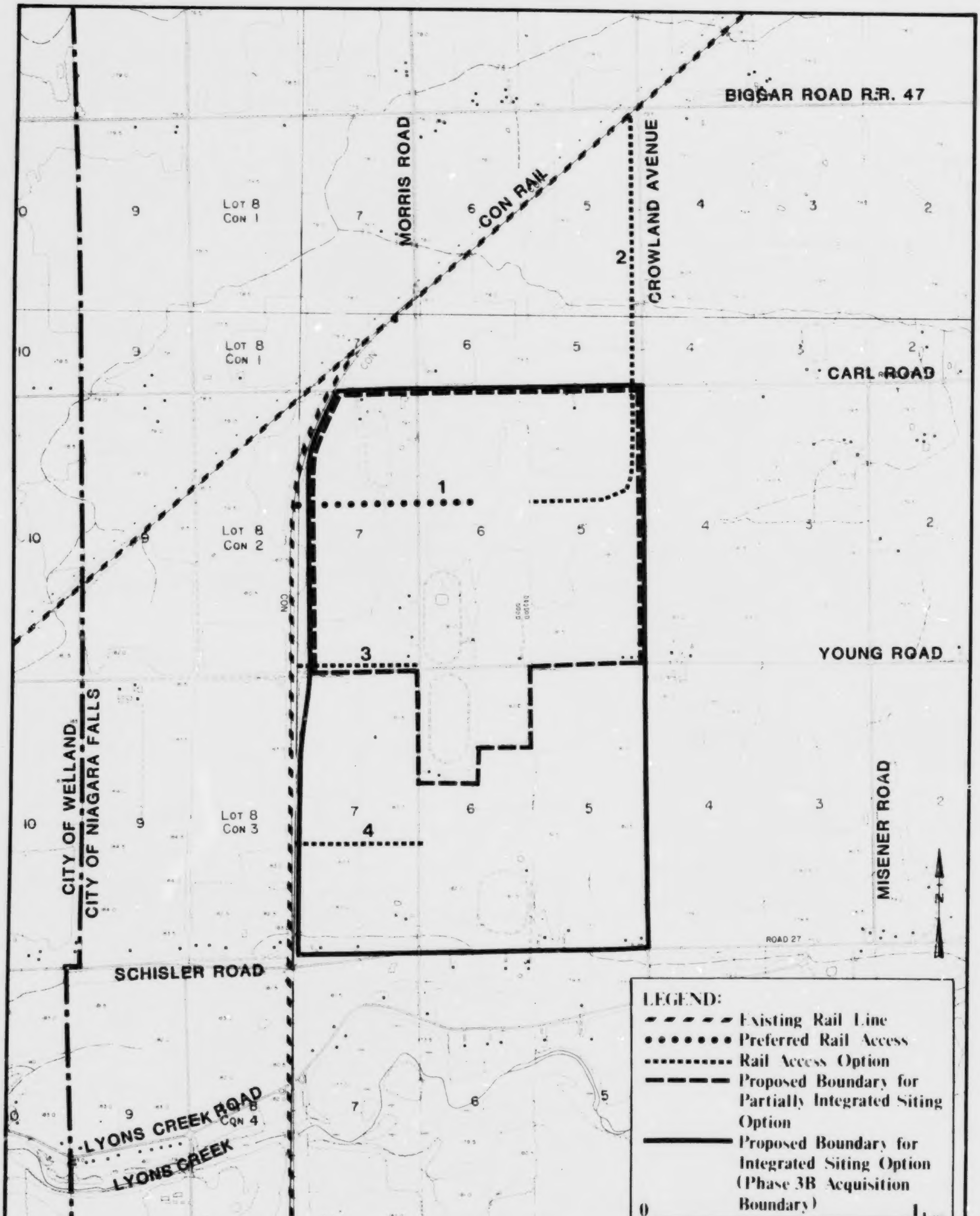
## LF - 4N
## RAIL ACCESS

FIGURE 5.2


KALAR ROAD
WELLAND RIVER
CHIPPAWA CREEK ROAD
ROAD 63
GRASSY BROOK ROAD
CON RAIL
FRASER
QEW
BIGGAR ROAD R.R. 47
CROWLAND AVENUE
MONTROSE ROAD
LYONS CREEK
CARL ROAD
MISENER ROAD
LEGEND:
Existing Rail Line
Preferred Rail Access
Phase 3B Acquisition Boundary
0
1 km

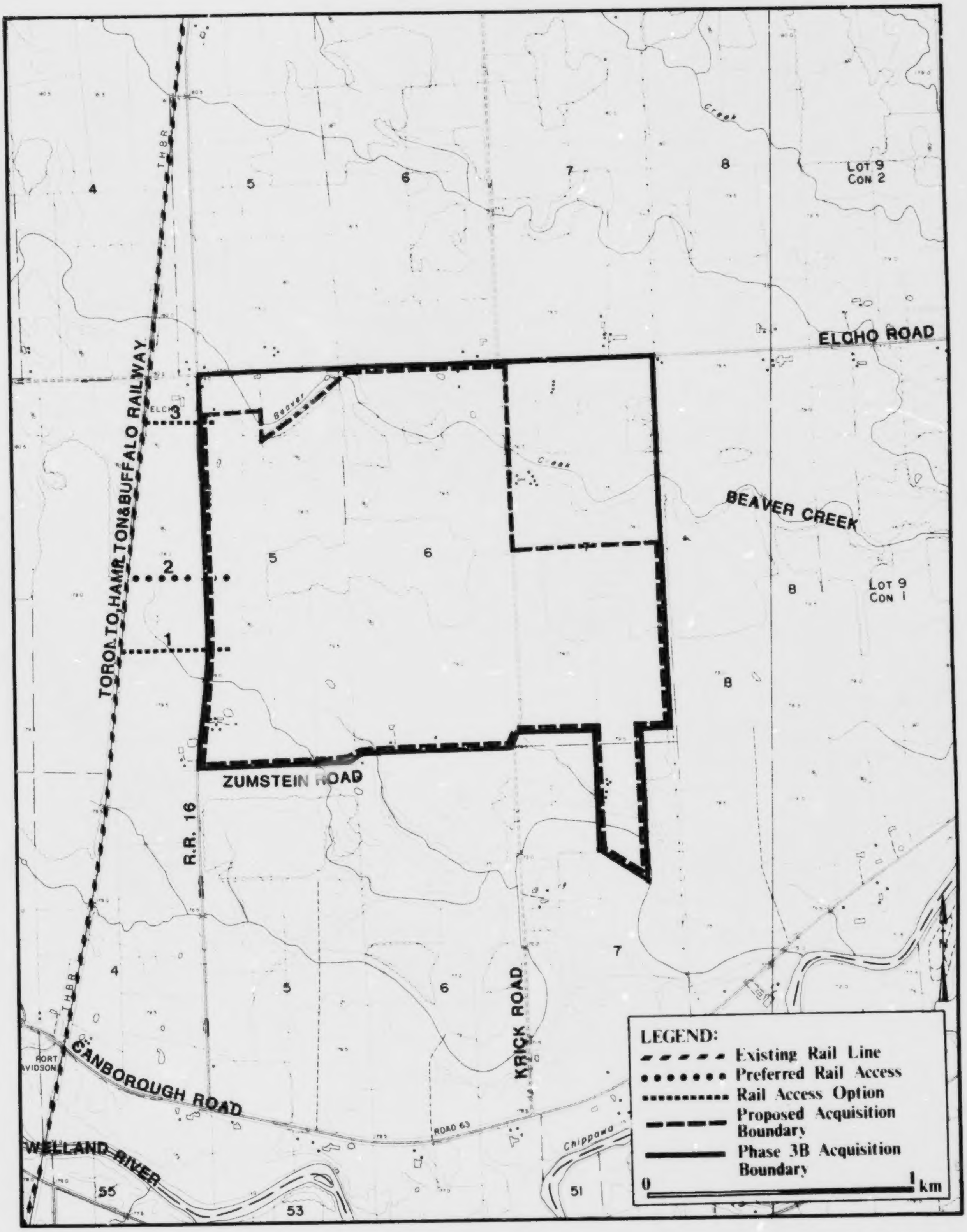
## PI-27E
## RAIL ACCESS

FIGURE 5.3


BIGGAR ROAD R.R. 47
MORRIS ROAD
CON RAIL
CROWLAND AVENUE
CARL ROAD
YOUNG ROAD
MISENER ROAD
SCHISLER ROAD
LYONS CREEK ROAD
LYONS CREEK
CITY OF WELLAND
CITY OF NIAGARA FALLS
LOT 8 CON 1
LOT 8 CON 2
LOT 8 CON 3
CON 4
ROAD 27
1
2
3
4
LEGEND:
Existing Rail Line
Preferred Rail Access
Rail Access Option
Proposed Boundary for Partially Integrated Siting Option
Proposed Boundary for Integrated Siting Option (Phase 3B Acquisition Boundary)
0
1 km
N

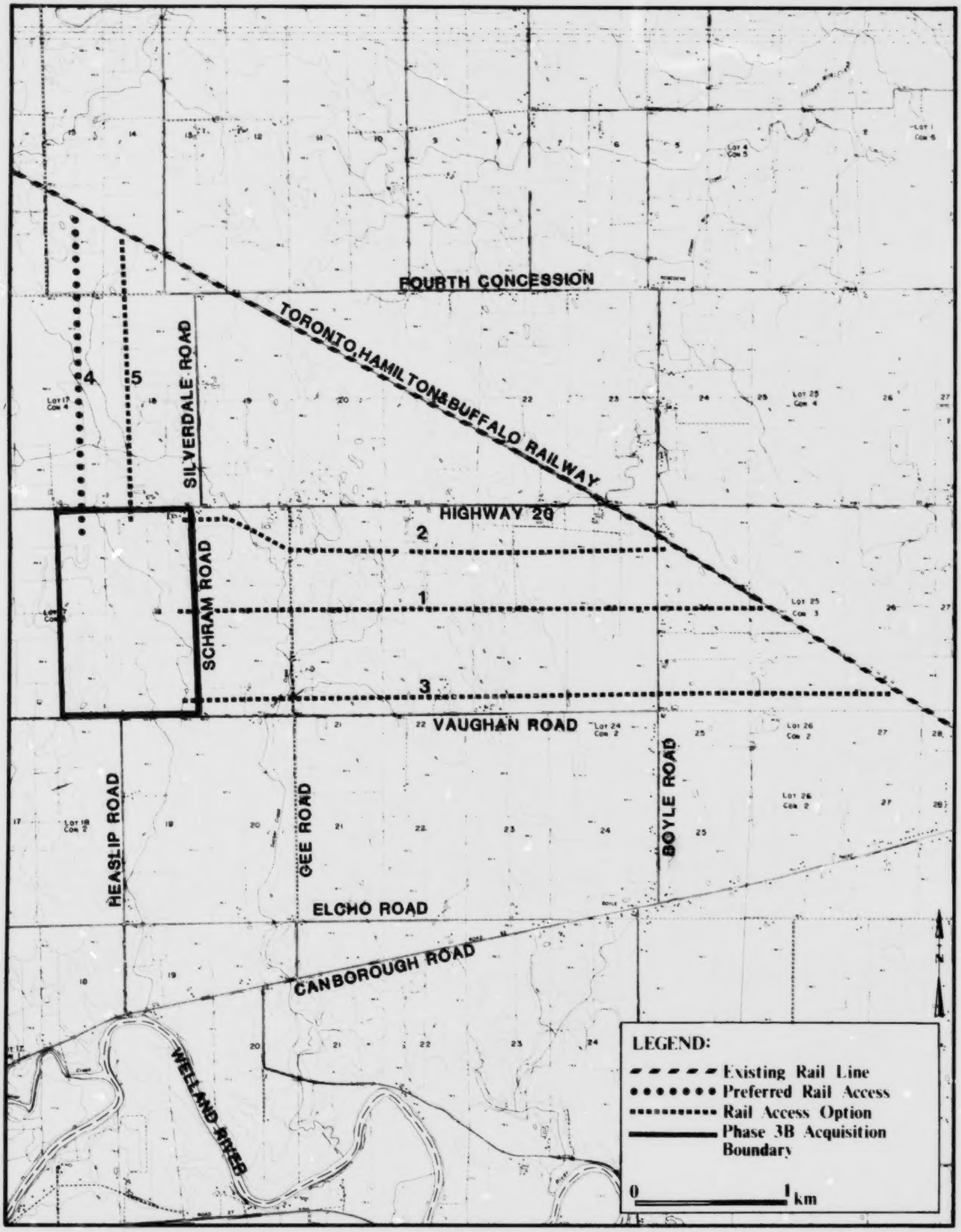
# LF-1E RAIL ACCESS

FIGURE 5.4


TORONTO, HAMILTON & BUFFALO RAILWAY
THBR
ELCHO ROAD
BEAVER CREEK
Beaver Creek
Creek
ZUMSTEIN ROAD
R.R. 16
KRICK ROAD
CANBOROUGH ROAD
ROAD 63
WELLAND RIVER
Chippawa
PORT DAVIDSON
ELCHO
Lot 9 Con 2
Lot 9 Con 1
1
2
3
4
5
6
7
8
51
53
55
LEGEND:
Existing Rail Line
Preferred Rail Access
Rail Access Option
Proposed Acquisition Boundary
Phase 3B Acquisition Boundary
0
1 km

## LF-3C RAIL ACCESS

FIGURE 5.5


FOURTH CONCESSION
TORONTO, HAMILTON & BUFFALO RAILWAY
SILVERDALE ROAD
HIGHWAY 20
SCHRAM ROAD
VAUGHAN ROAD
HEASLIP ROAD
GEE ROAD
BOYLE ROAD
ELCHO ROAD
CANBOROUGH ROAD
WELLAND RIVER
1
2
3
4
5
Lot 17 Con 4
Lot 25 Con 4
Lot 25 Con 3
Lot 24 Con 2
Lot 26 Con 2
Lot 18 Con 2
Lot 4 Con 5
Lot 1 Con 5
N
LEGEND:
Existing Rail Line
Preferred Rail Access
Rail Access Option
Phase 3B Acquisition Boundary
0
1 km

LF-9C
RAIL ACCESS

FIGURE 5.6

# CHAPTER 6

# ACCESS ROUTE OPTIONS

## 6.1 INTRODUCTION

The Phase 3B analysis resulted in the preliminary identification of a preferred route(s) to each of the candidate sites. The need to re-examine certain Phase 3B options, and the identification of several additional access route options after Phase 3B made it necessary to again consider access routes and select a preferred route(s) prior to comparing the siting options. This chapter documents the analyses undertaken of the alternative access routes to recommend a preferred route from a social perspective.

This chapter deals only with the evaluation of those access route options brought forward from Phase 3B for re-examination or identified after Phase 3B. The preferred access routes identified through these analyses or through the Phase 3B analysis were subsequently considered in the comparison of siting options.[1] The contribution of the preferred access routes to the comparison of siting options is documented in Chapter 9.0.

---

[1] Preferred access routes from Phase 3B were: the routes to PI1N, LF4N and PI13N from the QEW; the route linking PI13N to LF4N; the routes to LF2N from Highways 401 and 410.

The access route options were reviewed in two stages. In the first, preliminary stage, the level of analysis undertaken in Phase 3B was applied to all options brought forward from Phase 3B and all additional options identified by the transportation consultant, M.M. Dillon Ltd. In instances where the preliminary analysis served to identify a preferred access route, this route entered into the comparison of siting options. In cases where the analysis failed to identify a preferred route, the remaining options underwent comparative evaluation prior to the selection of a preferred route for the comparison of siting options.

The access route options considered in the Phase 4A analyses, and those ultimately identified as preferred routes, are listed in Appendix D and illustrated on Figures 6.1 to 6.12, at the end of this chapter. Appendix D also contains the data applied at both levels of the analysis.

## 6.2 PRELIMINARY ANALYSIS OF ACCESS ROUTE OPTIONS

### 6.2.1 STUDY APPROACH AND ASSUMPTIONS

As discussed above, the level of analysis undertaken at this stage was the same as that applied in Phase 3B. In order to bring all access route options to a comparable stage of analysis, it was necessary to review the options brought forward from Phase 3B and to examine the options identified after Phase 3B within the same framework.

As in Phase 3B, the main social considerations in the preliminary analysis were the potential for disruption of the use and enjoyment of residential properties, and of the operations of community and recreation features.

### Study Areas

One study area, adjacent to the access route, was applied in the preliminary analysis.[1]

## 6.2.2 IDENTIFICATION OF FACTORS AND INDICATORS

The preliminary analysis of potential disruption along access routes applied the following factors and indicators from Phase 3B:

### Factor: Estimated Population

Indicators: Dwelling Counts
Average Household Size

The product of dwelling counts (provided by Leon Kentridge Associates Ltd.), and the average household size for the municipality (from the 1981 Census) through which the access route option passed, was used as an estimate of the population adjacent to the option.

### Factor: Population Concentrations

Indicators: Number of Population Concentrations
Population

The number of population concentrations located adjacent to each access route option was recorded. The size of each concentration was obtained through secondary sources or estimated using dwelling counts and municipal average household size, as above. Estimated Population and Population Concentrations provided indications of the number of residents potentially affected should a given route be selected for access to a site.

---

1. The adjacent study area comprised all properties adjacent to the access route, defined as those with any boundary or part of a boundary (i.e., a corner) abutting an access route.

*Factor: Community and Recreation Features*

*Indicator: Number and Type of Community and Recreation Features*

*The number of community and recreation features located adjacent to each access route option was recorded. This information provided a numeric indication of total potential effect, should a given route be selected for access to a site. The types of features affected provided supplemental information in the determination of potential effect.*

### *6.2.3 DATA COLLECTION*

*Data were collected from the following sources for the preliminary analysis of access route options.*[1]

- *field investigations in Phase 3B for options brought forward to Phase 4A*
- *field investigations in Phase 4A along each additional option identified after Phase 3B*

### *6.2.4 ANALYSIS*

*The preliminary analysis was carried out for the following sites and site pairs:*[2]

*PI1N (two options)*
*LF4N (two options)*
*PI13N (three options)*
*LF3C (six options)*
*LF9C (three options)*
*LF1E (five options)*
*PI1N to LF2N (two options)*
*PI13N to LF2N (four options)*
*PI27E to LF1E (five options)*

---

[1] *Refer to Chapter 3.0, Data Collection and Analysis, for a discussion of the data collection process.*

[2] *Two options to PI27E were also identified. Neither of these options, however, was eliminated during the preliminary analysis, pending site boundary refinement. Consideration of these options, therefore, was deferred until the comparative evaluation of access route options was undertaken.*

The factors and indicators noted in Section 6.2.2 were applied to rank each access route option from a social perspective.

When ranking the access route options, preference was given to those options with the fewest residents, the smallest population concentrations, and the fewest community and recreation features. If, considering all of these factors, the overall potential for disruption along one option was clearly less than that along any of the other options, this option was preferred.

In some instances, however, there was not a clear preference for one route over another. When the overall ranking of two options appeared to be similar, the population-related factors were given preference in the ranking over the number of community and recreation features. It was assumed that the potential for disruption was greater for residents than for community and recreation features or their users. Residents generally occupy their dwelling and property full-time while community and recreation features are likely used intermittently and by different users. In instances where this ranking failed to identify a preference for one route, professional judgement was used to determine the relative importance of the community and recreation features along each access route. Features such as hospitals, homes for the aged, schools, and large community features were considered more important than features such as public works yards, golf courses, horse stables, small community centres and libraries.

Finally, in instances where consideration of the characteristics of features still failed to identify a preferred route, a decision was deferred until more detailed analysis was undertaken. A description of the access route options, and the data used in the preliminary analysis are contained in

Appendix D. The access route rankings and rationale for the rankings are shown on Table 6.1.

The social analysis, along with inputs from other members of the site selection team, contributed to the identification of preferred access routes. The aggregation of these inputs produced preferred access routes to PI1N, LF4N, PI13N, LF9C, from PI1N to LF2N, and from PI13N to LF2N. In all but the last case, the preferred route identified by the site selection team coincided with the preferred option as identified by the social analysis.

For the remaining sites and site pairs, at least one option was eliminated by the site selection team. Four of six options to LF3C, one of five options to LF1E, and one of five options from PI27E to LF1E were eliminated at this stage. The remaining access route options then underwent comparative evaluation, at a more detailed level of analysis, to permit the selection of a preferred route.

### TABLE 6.1
### PRELIMINARY ANALYSIS OF ACCESS ROUTE OPTIONS

| SITE | ACCESS ROUTE OPTION | RANKING[1] | RATIONALE |
|---|---|---|---|
| PI1N | 1 | 1 | • Although Option 1 has three more adjacent community and recreation features than does Option 2, Option 2 passes through Milton - a large population concentration. |
| | 2* | 2 | |
| LF4N | 1 | 1 | • See above |
| | 2* | 2 | |
| PI13N | 1 | 1 | • Option 3 has the most adjacent residents, population concentrations and community and recreation features. Although Option 1 also has a population concentration, total population along Option 2 is greater than along Option 1. |
| | 2* | 2 | |
| | 3* | 3 | |
| LF3C | 1 | 1 | • Option 2, 3, 4 and 5 have considerably larger adjacent population concentrations than do either Options 1 or 6. The overall differences between Option 1 and 6 are not significant enough to warrant elimination of either route at this stage. |
| | 2* | 2 | |
| | 3* | 5 | |
| | 4* | 4 | |
| | 5* | 3 | |
| | 6 | 1 | |
| LF9C | 1 | 1 | • Option 1 has less adjacent population, population concentrations, and features than do either Options 2 or 3. |
| | 2* | 2 | |
| | 3* | 3 | |
| LF1E | 1 | 2 | • Option 3 has the least adjacent population of all of the options and no community and recreation features. Only one other route, Option 2, has no adjacent features.<br>• Option 1, 4 and 5 all have more adjacent population and features than Option 3. |
| | 2* | 3 | |
| | 3 | 1 | |
| | 4 | 2 | |
| | 5 | 4 | |

---

[1] A ranking of 1 indicates the preferred access route option, as determined by the preliminary social analysis. The higher the ranking number, the less preferred the option from a social perspective.

* Access route options eliminated in the preliminary analysis, as determined by the site selection team. In cases where elimination left only one access route option, this option became the preferred route in the comparative evaluation of siting options. In cases where elimination left more than one access route option, those remaining options, underwent comparative evaluation prior to the selection of a preferred route for comparisons of the siting options.

TABLE 6.1
PRELIMINARY ANALYSIS OF ACCESS ROUTE OPTIONS

| SITE | ACCESS ROUTE OPTION | RANKING[1] | RATIONALE |
|---|---|---|---|
| PI1N to LF2N | 1 | 1 | • Milton, a large population concentration is adjacent to Option 2. Option 1 has fewer features adjacent to the route than does Option 2. |
| | 2* | 2 | |
| PI13N to LF2N | 1* | 2 | • Option 1 and 4 have considerably larger adjacent populations than do either Options 2 or 3. Option 4 also passes through Meadowvale West, a large population concentration and has many adjacent features. The overall differences between Options 2 and 3 are not significant enough to warrant elimination of either route at this stage. |
| | 2 | 1 | |
| | 3* | 1 | |
| | 4* | 3 | |
| PI27E to LF1E | 1 | 2 | • Option 3 has the least adjacent population of all the options, and no community or recreation features. |
| | 2* | 2 | |
| | 3 | 1 | |
| | 4 | 2 | |
| | 5 | 3 | |

## 6.3 COMPARATIVE EVALUATION OF ACCESS ROUTE OPTIONS

### 6.3.1 STUDY APPROACH AND ASSUMPTIONS

*The preliminary analysis resulted in the selection of a number of preferred access routes. There remained, however, several sites for which more than one access route option remained. These included sites LF3C, LF1E, PI27E, and site pairs PI27E-LF1E and PI1N-LF4N.*[1]

*The assumptions underlying the preliminary analysis of access route options were carried forward to the comparative evaluation exercise. The potential for disruption of the use and enjoyment of residential properties, and of the operations of community and recreation features, remained central considerations. The scope of the analysis, however, was expanded to include consideration of the potential for displacement of residents and community and recreation features, and to permit evaluation of both disruption and displacement in greater detail over larger study areas.*

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*[1] The two options to PI27E, on which a decision had been deferred pending site boundary refinement, now entered the analysis. The refinement of site boundaries for LF1E also resulted in the elimination of two options to LF1E, and two options linking PI27E and LF1E, that had been carried forward from the preliminary analysis. In relation to the refined boundaries, these routes no longer provided suitable access. Following boundary refinement for LF1E, however, two additional options to the site, and two additional options linking LF1E and PI27E were identified, and entered the comparative evaluation. PI1N also underwent site boundary refinement, and one additional route linking this site to LF4N was identified in order to avoid Boyne. The Phase 3B preferred route linking PI1N and LF4N, therefore, was carried forward for comparative evaluation with the newly identified option.*

Truck movements associated with an OWMC facility could disrupt residents' use and enjoyment of their properties and the operations of community and recreation features. Potential sources of disruption could include noise, dust,[1] vibrations, reduced accessibility, and nuisances due to evacuation in the event of an accident.

An access route to an OWMC facility might require road widenings and improvements. Consequently, consideration was given to the potential displacement of residents and community and recreation features along access routes.

OWMC truck movements along access routes could pose risk to human safety through increased traffic volumes, and risk to human health through an accident resulting in a spill of truck contents. The risk of traffic accidents was analysed by the transportation consultants (M.M. Dillon Ltd.). The social consultants provided data inputs to the transportation consultants for their assessment of risk. The risk to human health was analysed by the risk consultants, Environ.[2]

The following assumption was adopted to guide the application and evaluation of the social factors:

- the truck movements to the facility will occur during daytime hours on a five-day schedule, Monday through Friday

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[1] All access routes are to be upgraded to provincial standards which will considerably reduce the potential nuisance of dust but may not eliminate it entirely. This potential nuisance, therefore, remained a consideration in both the preliminary analysis and the comparative evaluation.

[2] Refer to Environ, Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Generic Risk Assessment, 1985.

The following data were provided by M.M. Dillon Ltd. (see M.M. Dillon Ltd., Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Transportation, 1985):

- the locations and extent of road widenings and improvements
- predicted increases in truck volumes
- candidate site access points (to define the end points of potential access routes for data collection)

## Study Areas

Two study areas were applied in the comparative evaluation of the access route options. These study areas were determined by the site selection team (see M.M. Dillon Ltd., Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985, for details on the development of the study areas).

Along both sides of each access route, extending from the relevant 400 series Highway to the site entrance, an 800 metre study area[1] was delineated. Within this 800 metre area, a second study area, adjacent to the access route,[2] was identified and separated from the larger area. The division of the 800 metre area into two exclusive study areas reflected the assumption that adjacent residents and features would likely experience potential disruption more frequently and to a greater degree than those in the 800 metre study area.

---

[1] The 800 metre study area along the access routes takes into account the greatest areal extent of impacts in the event of a transportation accident involving volatile substances which was identified as 500 metres on each side of the access routes. See Environ, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Generic Risk Assessment, 1985. Within this area, residents and community and recreation features may experience nuisance due to voluntary or forced evacuation. The additional 300 metres provides a margin of safety. Other potential impacts (i.e., dust, noise, vibration and reduced accessibility) are expected to be contained within 800 metres of an access route. Refer to the M.M. Dillon Ltd. Site Selection report, 1985, for a discussion of the assumptions and rationale for the use of this study area.

[2] As in the preliminary analysis, the adjacent study area comprised all properties adjacent to the access route, defined as those with any boundary or part of a boundary (i.e., a corner) abutting an access route.

### 6.3.2 IDENTIFICATION OF FACTORS AND INDICATORS

As discussed in Section 6.3.1, the main social considerations were the potential for the disruption of the use and enjoyment of residential properties and of the operations of community and recreation features. Also of concern was the potential displacement of residents and community and recreation features.

The following factors and indicators were applied during the comparative evaluation of access route options:[1]

Factor: Displacement of Residents

Indicator: Number of Residents

The number of residents who would be displaced due to road widenings and/or improvements was identified as a factor relevant to the analysis. In no instance, however, were any residents potentially displaced by road widenings or improvements. The displacement of residents factor, therefore, was screened from the analysis.

Factor: Displacement of Community and Recreation Features

Indicator: Number and Characteristics of Community and Recreation Features

Community and recreation features that would be displaced by road widenings and/or improvements was also identified as a relevant factor. In no instance was a community or recreation feature potentially displaced by road widenings or improvements. This factor, therefore, was also screened from the analysis.

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[1] See Appendix A for a detailed discussion of factors and indicators applicable to access routes.

Factor: Disruption of Day-to-Day Activities
and/or the Use and Enjoyment of Property

Indicator: Number of Residents

Potential sources of disruption to the daily use of residential properties could include noise, dust, vibration and reduced accessibility. Disruption of daily activities could also occur in the event of evacuation due to an accident involving an OWMC truck. The number of residents in the adjacent study area and in the 800 metre study area of each access route option was determined. The number of residents was estimated by multiplying dwelling counts (from Leon Kentridge Associates Ltd.) by the average municipal household size (from the 1981 Census) for the municipality through which the access route option passed.

Factor: Disruption of Operations of Community and Recreation Feaures

Indicator: Number and Characteristics of Community and Recreation Features

Potential sources of disruption to the operations of community and recreation features could include noise, dust, vibration and reduced accessibility associated with an increase in truck traffic. Disruption due to evacuation in the event of an accident is an additional nuisance that could affect community and recreation features along access routes. The number and characteristics of features in the adjacent study area and in the 800 metre study area of each access route option were determined. The number of features provided a quantifiable, comparable measure of total potential effect. The extent to which a feature serves sensitive users (children and *the elderly) and the extent of use of each feature, provided additional information to determine the potential effect.*

*As well as these factors and indicators, IER provided inputs to transportation risk related factors. These factors and indicators were as follows:*

*Factor: Number and Characteristics of People Along Access Routes*

*Indicator: Population concentrations. The population concentrations in the adjacent study area and in the 800 metre study area of each access route option.*

*Indicator: Number and characteristics of populations using community and recreation features. The number of people using each feature (if known) and any sensitive populations served (children and the elderly).*

*Factor: Operations of Community and Recreation Features*

*Indicator: Number and characteristics of community and recreation features. The community and recreation features in the adjacent study area and in the 800 metre study area of each access route option were noted. Characteristics of the features considered were the extent of use (daily, part-time or occasional) and time of use (daytime, evening, weekend, seasonal).*

### *6.3.3 DATA COLLECTION*

*Data were collected from the following sources for the comparative evaluation of access route options:*[1]

- *field investigations along each access route to confirm previously collected data, and within the 800 metre study area, to identify community and recreation features.*
- *contacts with representatives of community and recreation features to obtain information on their facility's use and users.*

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*1. Refer to Chapter 3.0, Data Collection and Analysis, for a discussion of the data collection process.*

### 6.3.4 ANALYSIS

The comparative evaluation was carried out for the following sites and site pairs:

LF3C (two options)
PI27E (two options)
LF1E (four options)
PI27E to LF1E (four options)
PI1N to LF4N (two options)

The data used in the comparative evaluation of access routes are contained in Appendix D. These tables should be read in conjunction with the following descriptions of the major characteristics of the access route options. The options considered are illustrated on Figures 6.1 to 6.12 at the end of this chapter. The locations of community and recreation features along the routes are shown in the M.M. Dillon Ltd., Site Selection Report, 1985.

#### LF3C

The two access route options to LF3C follow the same roads with the only difference being the connecting roads from Highway 20 to the site. The information for these route sections was used as the basis for the comparison presented below. The route sections used for comparison are underlined in the descriptions of Options 1 and 2.

Option 1: from QEW: south on Regional Road 24; west on Highway 20; south on Regional Road 27; west on Elcho Road to LF3C

An estimated residential population of 105 is located adjacent to this option. The Gainsborough Centennial Hall is adjacent to the access route. The hall is used irregularly; no information is available on its users. Within the 800 metre study area is an approximate population of 43 and Bismark United Church and Cemetery. The church has 85 members; 50% of its users are children.

Option 2: from QEW: south on Regional Road 24; west on Highway 20; west on Regional Road 65; south on Krick Road to LF3C

The residential population adjacent to this option is estimated to be 63. Bismark United Church (85 members; 50% users are children) and Cemetery are adjacent to the route. Within the 800 metre study area is an estimated residential population of 36. No community or recreation features are located within this study area.

PI27E

Option 1: from QEW: west on Biggar Road (Regional Road 47) to PI27E

The population adjacent to the route is estimated to be 6. The Arpad Hungarian Cultural Centre is located adjacent to the route. The cultural centre has 48-55 members, of which 20% are senior citizens and 40% are children. Within the 800 metre study area is an estimated population of 37. McCredie Cemetery and Willo-Dell Golf and Country Club are located in the 800 metre study area. Senior citizens represent approximately 25% of the golf club's users, while 5% of the users are under 20 years of age. Willo-Dell Golf and Country Club has 450 members and 3,000 seasonal green fee players.

Option 2: from QEW: west on Biggar Road (Regional Road 47); north on Regional Road 98 (Montrose Road) to PI27E

No residents are located adjacent to the access route. One recreation feature, Arpad Hungarian Cultural Centre (48-55 members; 20% senior citizens, 40% children) is located adjacent to the route. Within the 800 metre study area is an estimated residential population of 42. McCredie Cemetery and Willo-Dell Golf and Country Club (450 members; 3,000 seasonal green fee players; 25% of its users are senior citizens and 5% are under 20 years of age) are located within the 800 metre study area.

### LF1E

Option 1: from QEW: west on Biggar Road (Regional Road 47); south on Regional Road 98 (Montrose Road); west on Carl Road to LF1E

The residential population adjacent to this route is estimated at 28. The Arpad Hungarian Cultural Centre (48-55 members; 20% senior citizens; 40% children; 150-160 users at peak times) is adjacent to the route. Within the 800 metre study area is an estimated population of 59. Willo-Dell Golf and Country Club and McCredie Cemetery are within the 800 metre study area. The Willo-Dell Golf and Country Club is used by 450 members and 3,000 seasonal green fee players. Five percent of the users are under 20 years of age and 25% are over 60 years of age.

Option 2: from QEW: west on Biggar Road (Regional Road 47); south on Crowland Avenue to LF1E

The residential population adjacent to this route is estimated to be 45. The Arpad Hungarian Cultural Centre (48-55 members; 20% senior citizens; 40% children; 150-160 users at peak times) is adjacent to the route. The estimated population within the 800 metre study area is 62. The Willo-Dell Golf and Country Club (450 members and 3,000 green fee players per season; 5% of the users are under 20 years of age and 25% are over 60 years of age) and McCredie Cemetery are located within this study area.

Option 5:* from QEW: west on Biggar Road (Regional Road 47); south on Crowland Avenue; west on Carl Road to LF1E

An estimated population of 45 is located adjacent to this option. The Arpad Hungarian Cultural Centre is adjacent to the route. A residential population of 59 is estimated to be within 800 metres of the route. The Willo-Dell Golf and Country Club and McCredie Cemetery are located within the 800 metre study area.

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* Options 3 and 4 were eliminated following site boundary refinements for LF1E since they no longer provided suitable access. Options 5 and 6 were added following site boundary refinement for LF1E.

Option 6:* from QEW: west on Biggar Road (Regional Road 47); south on Regional Road 98 (Montrose Road); west on Carl Road; south on Crowland Avenue to LF1E

The population adjacent to the route is estimated to be 28. One recreation feature, Arpad Hungarian Cultural Centre, is located adjacent to the route. Within the 800 metre study area is an estimated population of 56. Willo-Dell Golf and Country Club and McCredie Cemetery are located within the 800 metre study area.

PI27E to LF1E

Option 1: from PI27E: east on Biggar Road (Regional Road 47); south on Regional Road 98 (Montrose Road); west on Carl Road to LF1E

An estimated population of 34 is located adjacent to this option. The Arpad Hungarian Cultural Centre is adjacent to the route. An estimated residential population of 20 is within the 800 metre study area. The McCredie Cemetery and Willo-Dell Golf and Country Club are located in this study area.

Option 2: from PI27E: west on Biggar Road (Regional Road 47); south on Crowland Avenue to LF1E

An estimated population of 9 is situated adjacent to option 2, and an additional 26 people live within the 800 metre study area. There are no community or recreation features adjacent to this option. The Arpad Hungarian Cultural Centre is located within the 800 metre study area.

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* Options 3 and 4 were eliminated following site boundary refinement for LF1E since they no longer provided suitable access. Options 5 and 6 were added following site boundary refinement for LF1E.

Option 5:* from PI27E: west on Biggar Road (Regional Road 47); south on Crowland Avenue; west on Carl Road to LF1E

The residential population adjacent to this route is estimated at 3. No community or recreation features are adjacent to Option 5. An estimated residential population of 36 is located within the 800 metre study area. The Arpad Hungarian Cultural Centre is located within the 800 metre study area.

Option 6:* from PI27E: east on Biggar Road (Regional Road 47); south on Regional Road 98 (Montrose Road); west on Carl Road; south on Crowland Avenue to LF1E

Twenty-eight residents are estimated to be located adjacent to this access route option. One feature, Arpad Hungarian Cultural Centre, is adjacent to the route. Within the 800 metre study area is an estimated residential population of 28. The Willo-Dell Golf and Country Club and McCredie Cemetery are located in the study area.

### PI1N to LF4N[1]

Option 1: from PI1N: north on First Line; west on Britannia Road to LF4N

An estimated 3 people live adjacent to this access route option. One feature, Hunterbrook Farms, is located adjacent to the route. Within the 800 metre study area, there are an estimated 32 residents, and no community or recreation features.

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[1] PI1N underwent site boundary refinement in Phase 4A, and one additional route linking this site to LF4N was identified in order to avoid Boyne. The Phase 3B preferred route linking PI1N and LF4N, therefore, was carried forward for comparative evaluation with the newly identified option.

* Options 3 and 4 were eliminated following site boundary refinement for LF1E since they no longer provided suitable access. Options 5 and 6 were added following site boundary refinement for LF1E.

Option 2: from PI1N: north on Highway 25; west on
Britannia Road to LF4N

An estimated 32 people live adjacent to this route. Hunterbrook Farms is also located adjacent to the route. Within the 800 metre study area, there are an estimated 54 residents, and three community and recreation features. Boyne Community Centre attracts roughly 335 uses per week. Boyne Community Park is used by about 250 people per week for organized sports activities. Park users include children. The Croatian Club Karlovac is a proposed feature, intended for uses such as meetings and social events.

### 6.3.5 RANKING AND AGGREGATION OF FACTORS

The factors discussed in Section 6.3.2 pertained to the study areas as follows:

- disruption of day-to-day activities and/or the use and enjoyment of property adjacent to the access route
- disruption of day-to-day activities and/or the use and enjoyment of property within the 800 metre study area along the access route
- disruption of the operations of community and recreation features adjacent to the access route
- disruption of the operations of community and recreation features within the 800 metre study area along the access route

When ranking the access route options, greater weight was given to the adjacent study area for both residents and features. It was assumed that potential disruption would affect adjacent residents and features more frequently to a greater degree than those in the 800 metre study area. The adjacent study area was applied first to rank the access route options, using the following general impact categories as guidelines to assist in the ranking:

1) least impact - less than 50 residents and no community or recreation features adjacent to the route

2) little impact - 50-100 residents and/or one community or recreation feature adjacent to the route

3) moderate impact - 101-200 residents and/or 2 or 3 community or recreation features adjacent to the route

4) high impact - 201-400 residents and/or 4 or 5 community or recreation features adjacent to the route

5) most impact - more than 400 residents and/or more than 5 community or recreation features adjacent to the route

In instances where the number of residents and the number of features spanned more than one category, the option was ranked in the category reflecting the greatest impact. For example, an option with less than 50 residents and 3 features adjacent to the route was ranked in category 3.

Within this framework, community and recreation features were also assessed on the basis of their characteristics. Greater weight was given to features that are used daily or almost daily and/or serve a sensitive population (i.e., children, the elderly). Such features included schools, churches, and parks. Conversely, features which appeared to be used infrequently or occasionally and did not serve a sensitive population were given minimal consideration in the ranking. Professional judgement was used to determine whether or not the importance of features warranted a shift to a category reflecting greater overall impact.

Once the ranking had been established through the application of the factors to the adjacent study area, each option was reviewed in terms of the factors as they applied to the 800 metre study area. Professional judgement was again used to determine whether or not the additional population, and the number and characteristics of features within the 800 metre study area, warranted a shift to a category reflecting greater overall impact.

### 6.3.6 APPLICATION OF FACTORS

Table 6.2 shows the rankings assigned to the access route options and the rationale for the rankings, from a social perspective. The ranking of the access route options in Table 6.2 was used in conjunction with the rankings completed by the other members of the site selection team to identify a preferred access route option for each site. In all instances, the preferred route identified by the site selection team coincided with the least, or one of the least, socially impacted option(s).

The Phase 4A comparative evaluation and preliminary analysis of access routes, and the Phase 3B analysis each contributed to the selection of preferred access routes for the comparative evaluation of siting options. The routes identified by the site selection team, at each stage of the analysis, are described briefly below.

Preferred routes identified in Phase 3B Analysis:

- the route to PI1N from the QEW
- the route to LF4N from the QEW
- the route to PI13N from the QEW
- the route to LF2N from Highway 401
- the route to LF2N from Highway 410
- the route linking PI13N to LF4N

Preferred routes identified in Phase 4A Preliminary Analysis:

- the route to PI1N from Highway 401
- the route to LF4N from Highway 401
- the route to PI13N from Highway 401
- the route to LF9C from the QEW
- the route linking PI1N to LF2N
- the route linking PI13N to LF2N

## TABLE 6.2
## COMPARATIVE EVALUATION OF ACCESS ROUTE OPTIONS
## RANKING OF ACCESS ROUTE OPTIONS

| SITING OPTION | ACCESS ROUTE OPTION | IMPACT CATEGORY[1] | RATIONALE |
|---|---|---|---|
| LF3C | 1 | 3 | • Option 1 has 101-200 residents and one community feature adjacent to the route.<br>• Option 2 has 50-100 residents and one community feature adjacent to the access route. |
| | $2^+$ | 2 | |
| PI27E | $1^+$ | 2 | • Options 1 and 2 have less than 50 people along the access routes and one community and recreation feature. |
| | 2 | 2 | |
| LF1E[2] | 1 | 2 | • Options 1, 2, 5 and 6 have less than 50 residents adjacent to the access route, and one community and recreation feature, which has some sensitive users adjacent to the route. |
| | 2 | 2 | |
| | $5^+$ | 2 | |
| | 6 | 2 | |
| PI27E/ LF1E[2] | 1 | 2 | • Options 2 and 5 have less than 50 residents adjacent to the access route and no community and recreation features.<br>• While options 1 and 6 have less than 50 residents adjacent to the route, a community and recreation feature that serves some sensitive users is located along the routes. |
| | 2 | 1* | |
| | $5^+$ | 1 | |
| | 6 | 2 | |
| PI1N/LF4N | $1^+$ | 2* | • Both Options 1 and 2 have less than 50 adjacent residents and one adjacent recreation feature. Within the 800 metre study area, Option 1 has an additional 32 residents but no features while Option 2 has 54 additional residents and three features, at least one of which services a sensitive population. |
| | 2 | 3* | |

---

* The categories noted with the asterisk are considered to be more impacted because of the additional weight given population and/or features within the 800m study area.

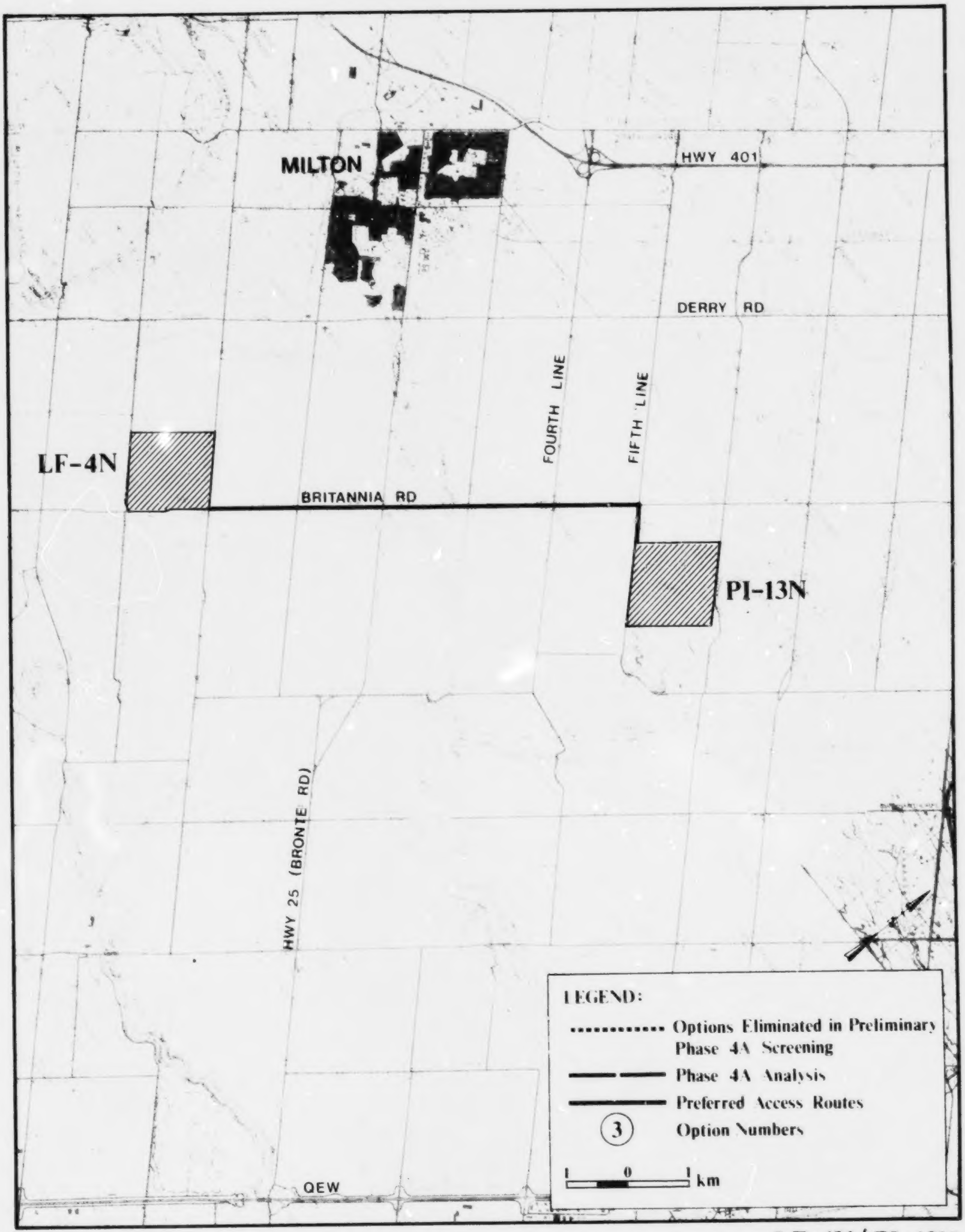
+ Preferred access routes, as determined by the site selection team.

1. The higher the impact category number, the less preferred the option from a social perspective.
2. Options 3 and 4 of LF1E and PI27E to LF1E were eliminated following site boundary refinements since they no longer provided suitable access.

*Preferred routes identified in Phase 4A Comparative Evaluation:*

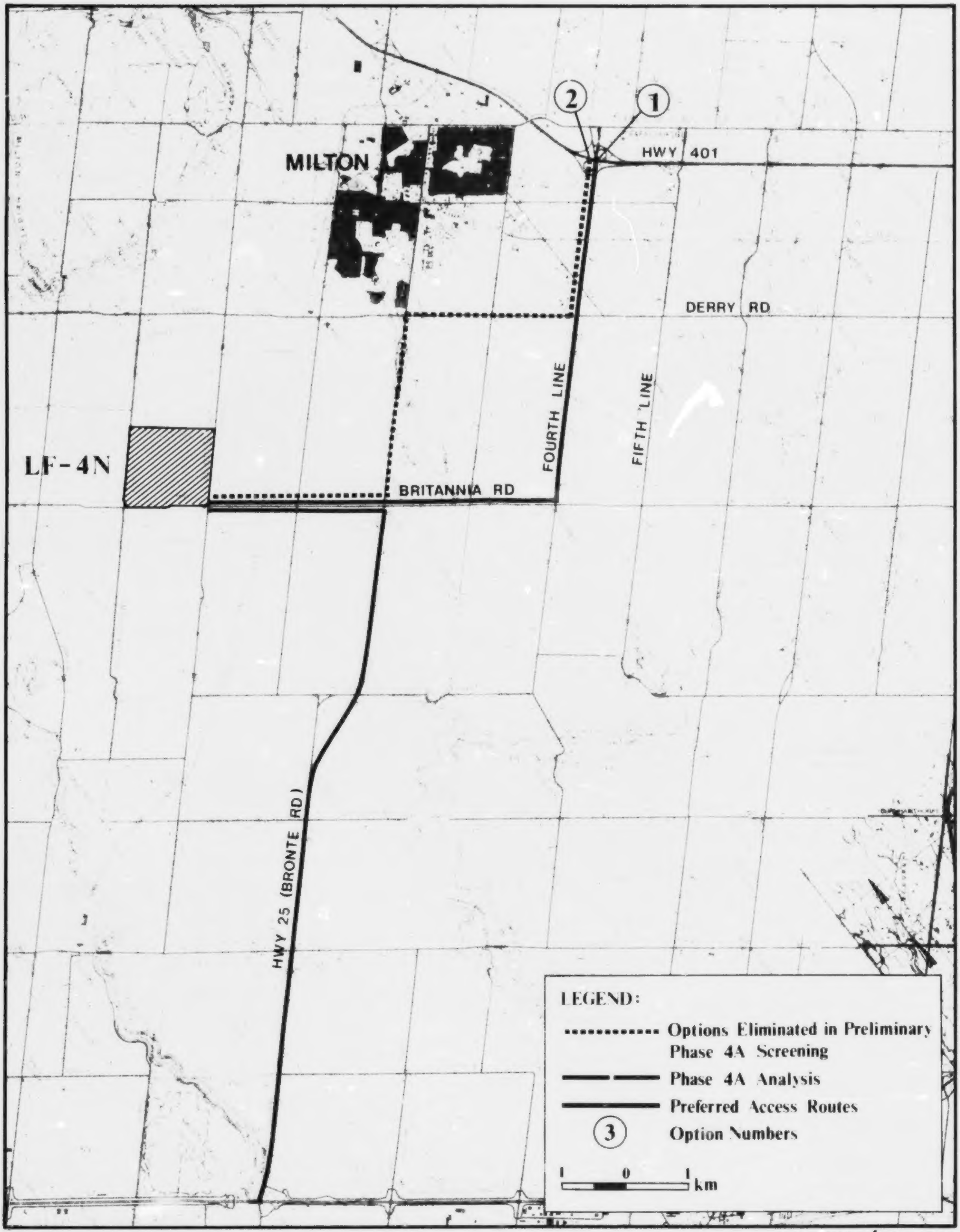
- *the route to LF3C from the QEW*
- *the route to PI27E from the QEW*
- *the route to LF1E from the QEW*
- *the route linking PI27E to LF1E*
- *the route linking PI1N to LF4N*

*In Chapter 9, Comparative Evaluation of Siting Options, these routes are incorporated in a detailed, numerically weighted analysis of potential social impact.*


MILTON
HWY 401
DERRY RD
FOURTH LINE
FIFTH LINE
LF-4N
BRITANNIA RD
PI-13N
HWY 25 (BRONTE RD)
QEW
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
3
Option Numbers
1
0
1
km

LF-4N/ PI-13N
PI-13N TO LF-4N
PHASE 4A ACCESS ROADS

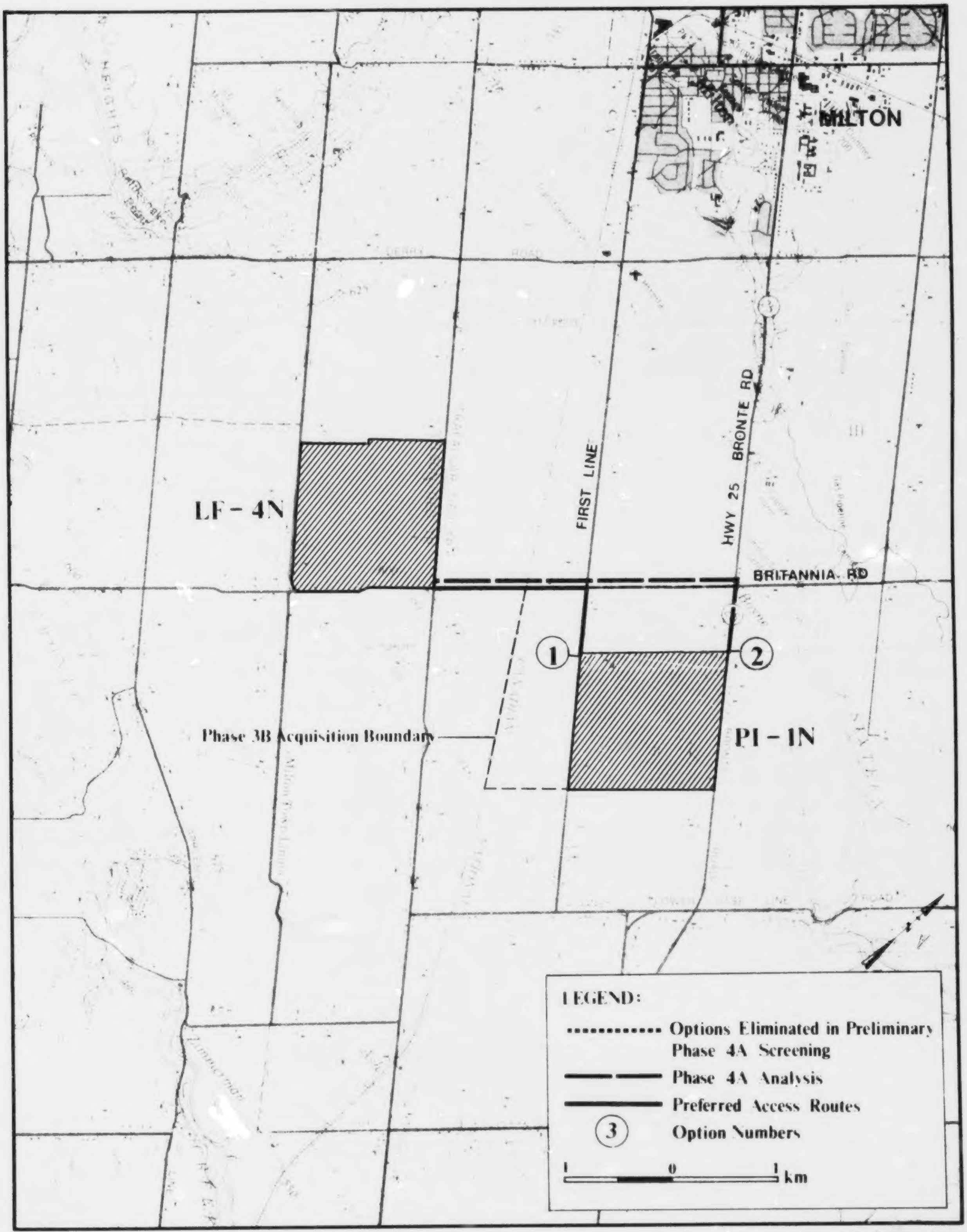
FIGURE 6.1



MILTON
HWY 401
DERRY RD
FOURTH LINE
FIFTH LINE
LF-4N
BRITANNIA RD
HWY 25 (BRONTE RD)
①
②
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
③ Option Numbers
1 0 1 km

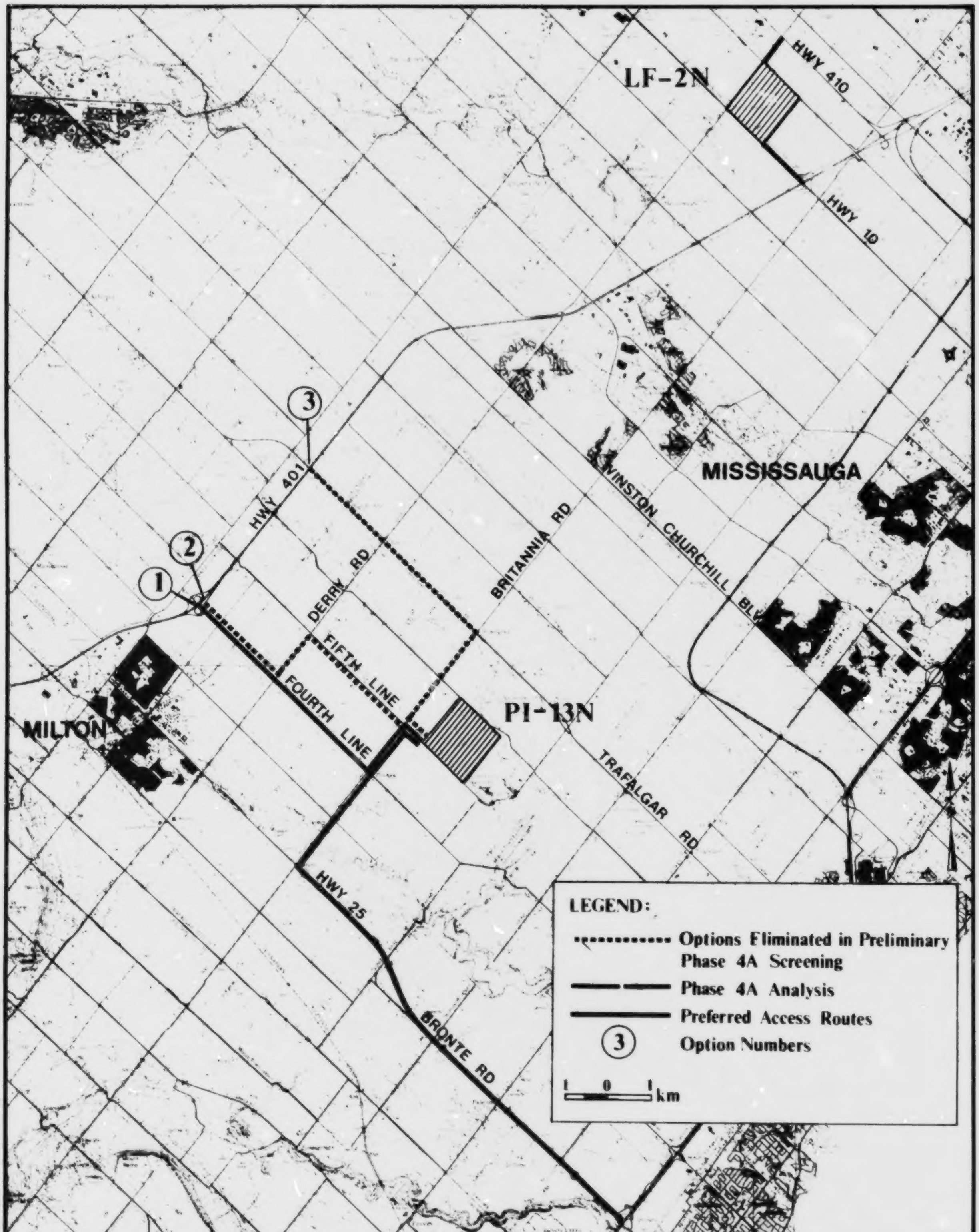
LF-4N /PI-1N
TO LF-4N
PHASE 4A ACCESS ROADS

FIGURE 6.2

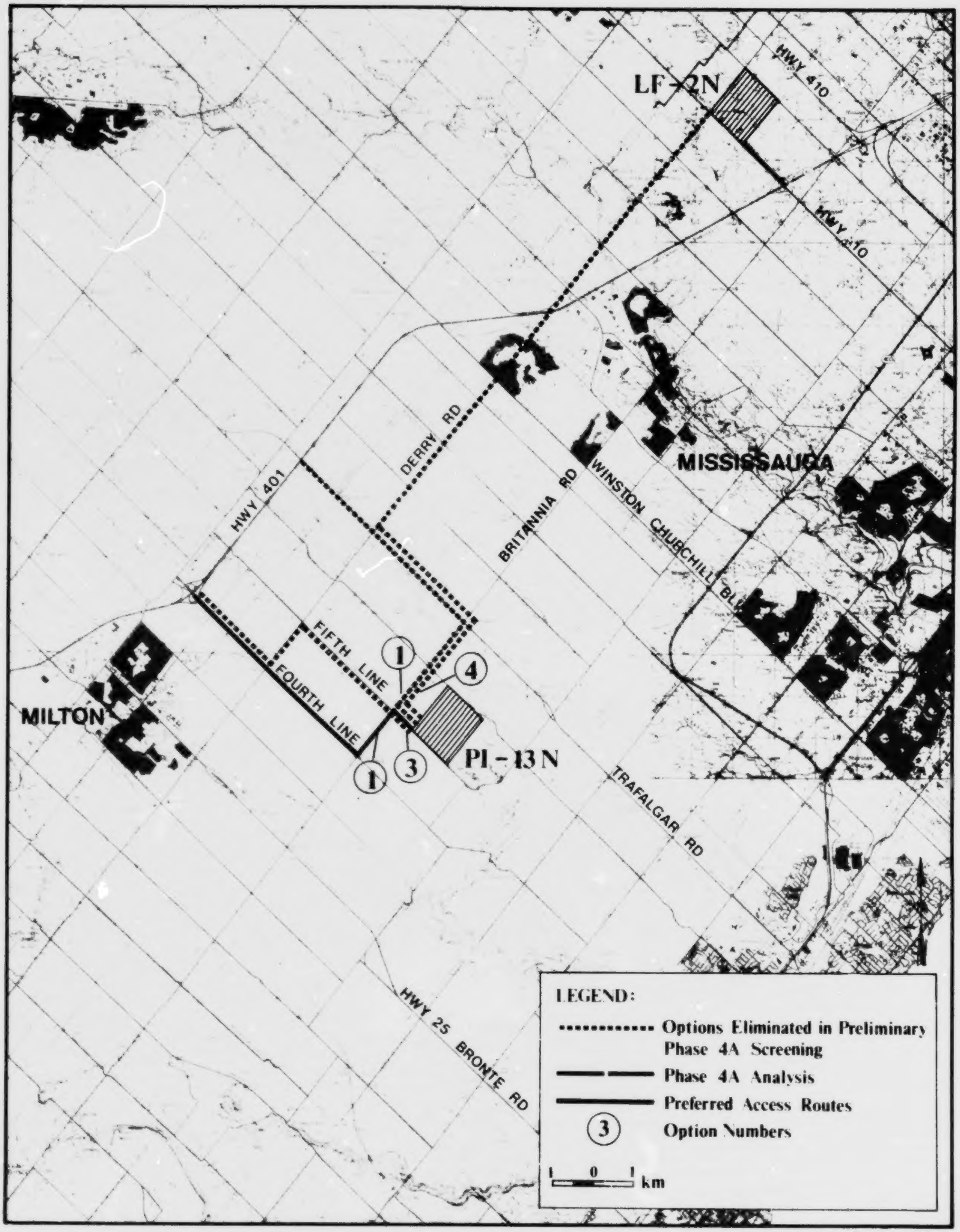

MILTON
DERRY ROAD
LF - 4N
FIRST LINE
HWY 25 BRONTE RD
BRITANNIA RD
1
2
Phase 3B Acquisition Boundary
PI - 1N
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
3
Option Numbers
1
0
1
km

LF-4N/ PI-1N
PI - 1N TO LF-4N
PHASE 4A ACCESS ROADS

FIGURE 6.3

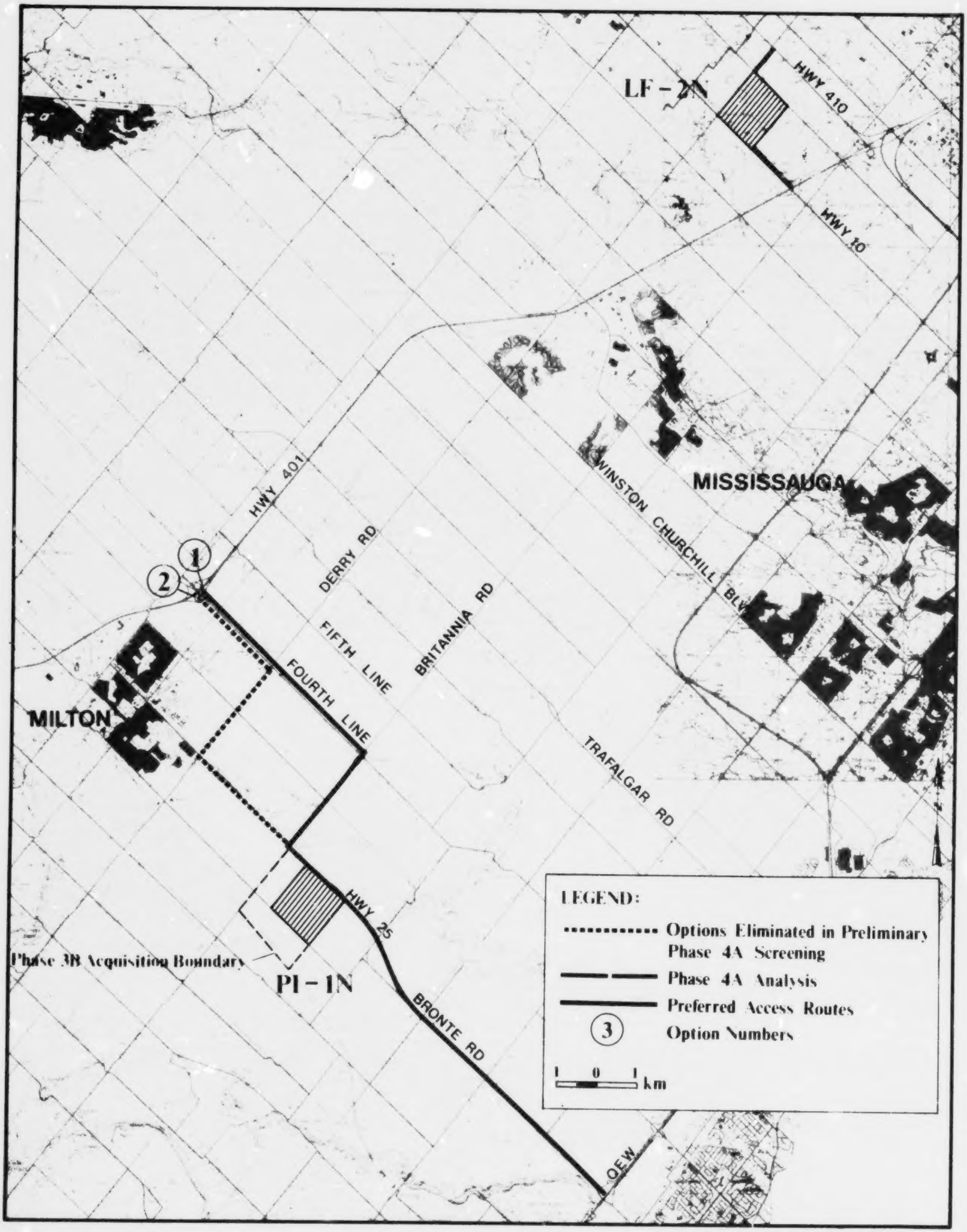

LF-2N
HWY 410
HWY 10
MISSISSAUGA
WINSTON CHURCHILL BLV
BRITANNIA RD
HWY 401
③
②
①
DERRY RD
FIFTH LINE
FOURTH LINE
MILTON
PI-13N
TRAFALGAR RD
HWY 25
BRONTE RD
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
③ Option Numbers
1 0 1 km

LF-2N/PI-13N
TO PI-13N
PHASE 4A ACCESS ROADS
FIGURE 6.4


LF-2N
HWY 410
HWY 410
MISSISSAUGA
DERRY RD
HWY 401
BRITANNIA RD
WINSTON CHURCHILL BL
FIFTH LINE
FOURTH LINE
MILTON
1
4
1
3
PI-13N
TRAFALGAR RD
HWY 25 BRONTE RD
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
3
Option Numbers
0
km

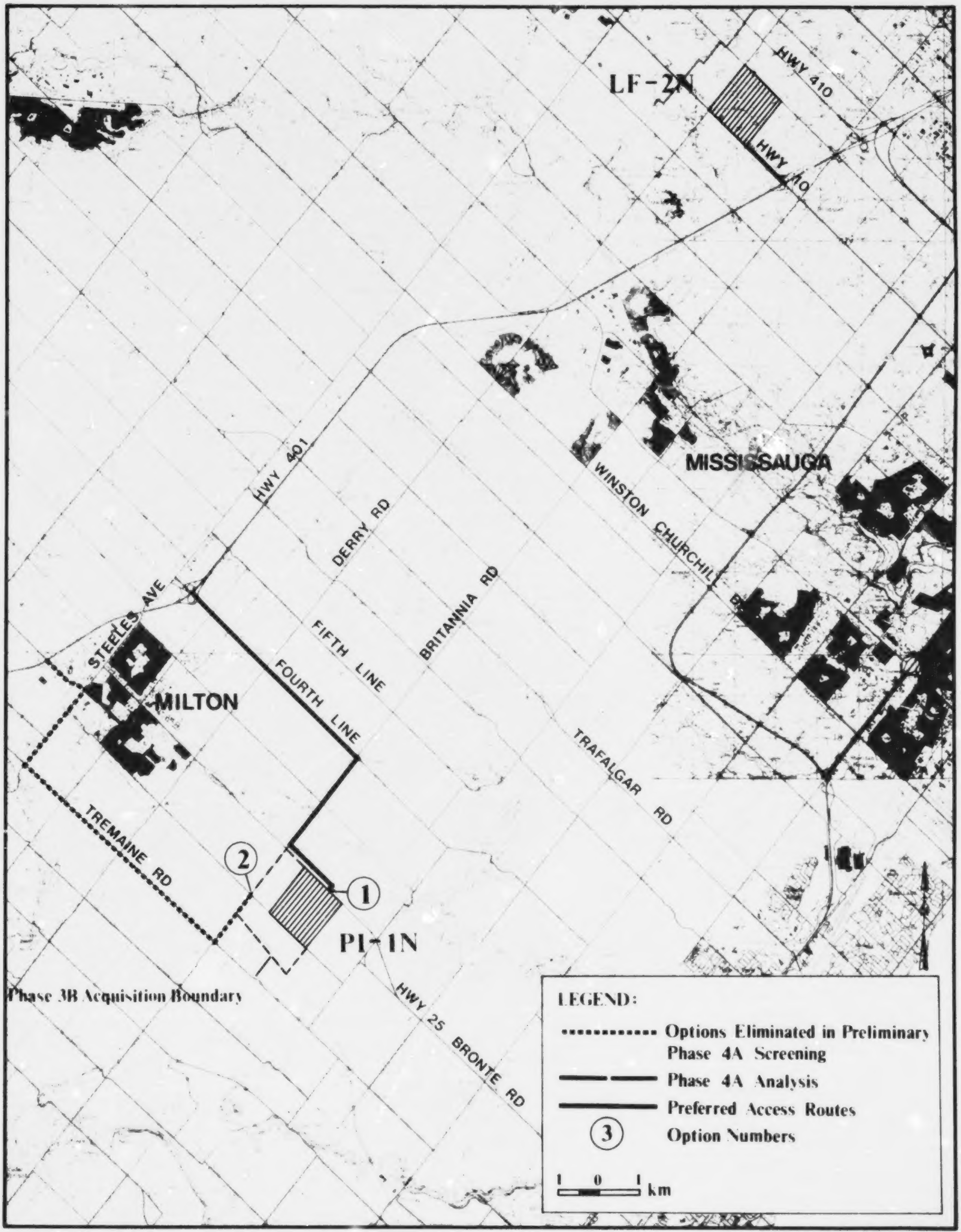
LF-2N/ PI-13N
PI-13N TO LF-2N
PHASE 4A ACCESS ROADS

FIGURE 6.5


LF - 2N
HWY 410
HWY 10
MISSISSAUGA
WINSTON CHURCHILL BLVD
HWY 401
DERRY RD
FIFTH LINE
BRITANNIA RD
FOURTH LINE
TRAFALGAR RD
MILTON
①
②
HWY 25
BRONTE RD
QEW
Phase 3B Acquisition Boundary
PI - 1N
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
③ Option Numbers
1 0 1 km

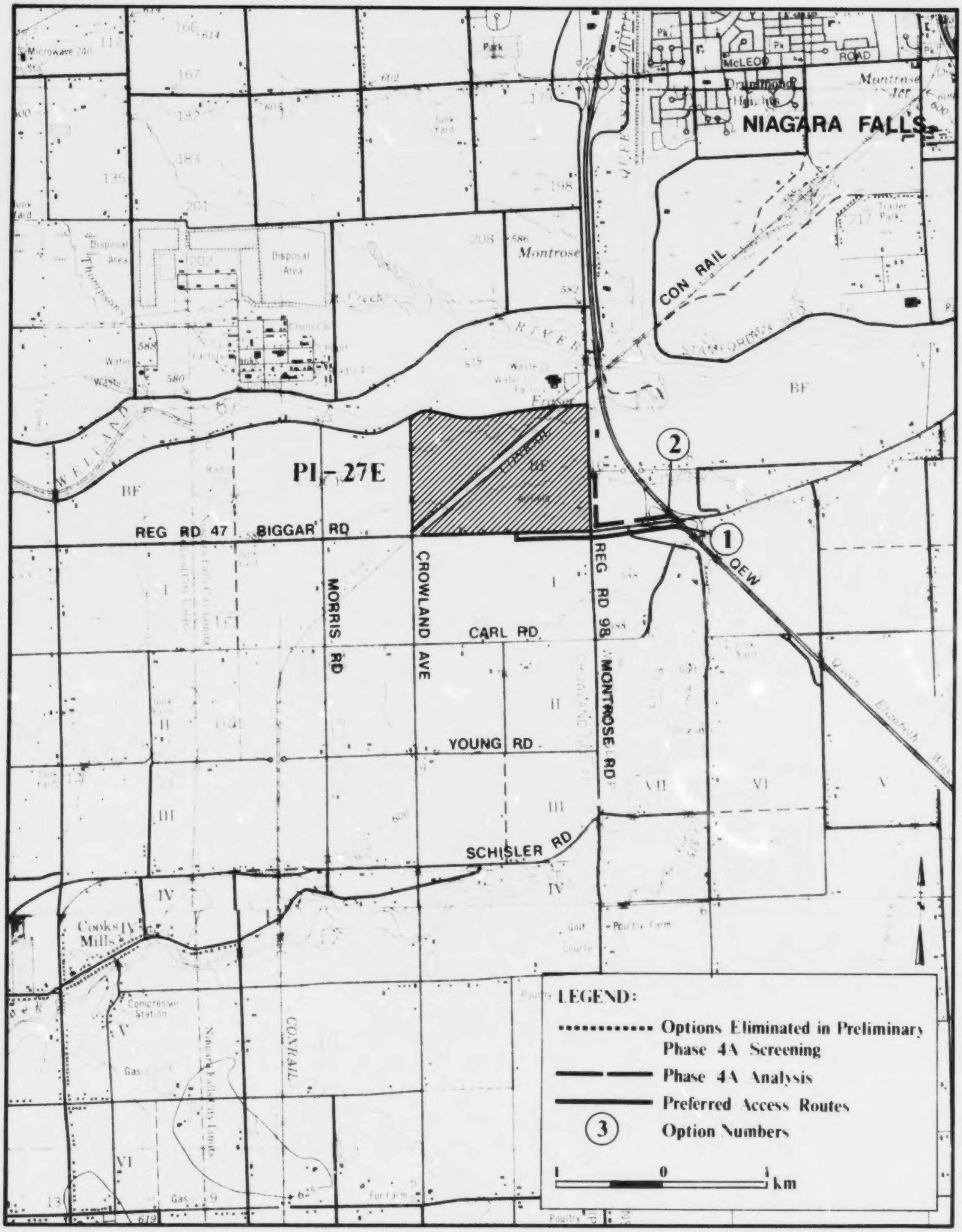
LF-2N/PI-1N
TO PI-1N
PHASE 4A ACCESS ROADS

FIGURE 6.6


LF-2N
HWY 410
HWY 10
MISSISSAUGA
WINSTON CHURCHILL BLVD
HWY 401
DERRY RD
BRITANNIA RD
FIFTH LINE
FOURTH LINE
STEELES AVE
MILTON
TRAFALGAR RD
TREMAINE RD
2
1
PI-1N
HWY 25 BRONTE RD
Phase 3B Acquisition Boundary
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
3
Option Numbers
1 0 1 km

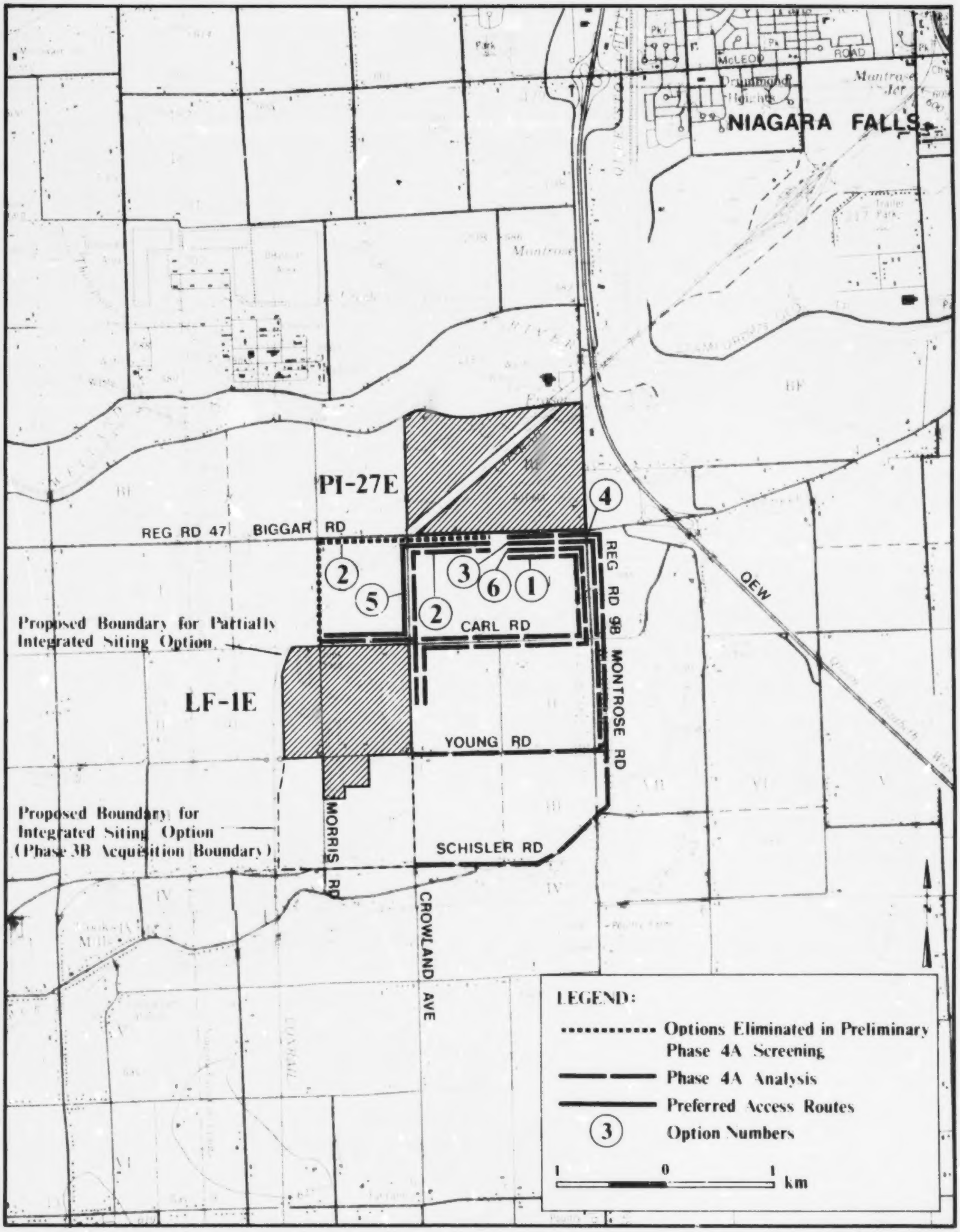
LF-2N/PI-1N
PI-1N TO LF-2N
PHASE 4A ACCESS ROADS

FIGURE 6.7


NIAGARA FALLS
McLEOD ROAD
Drummond Heights
Montrose
CON RAIL
STANFORD
WELLAND RIVER
PI-27E
BF
REG RD 47 BIGGAR RD
MORRIS RD
CROWLAND AVE
REG RD 98 MONTROSE RD
CARL RD
YOUNG RD
SCHISLER RD
QEW
Queen Elizabeth Way
CONRAIL
Cooks Mills
①
②
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
③ Option Numbers
1 0 1 km

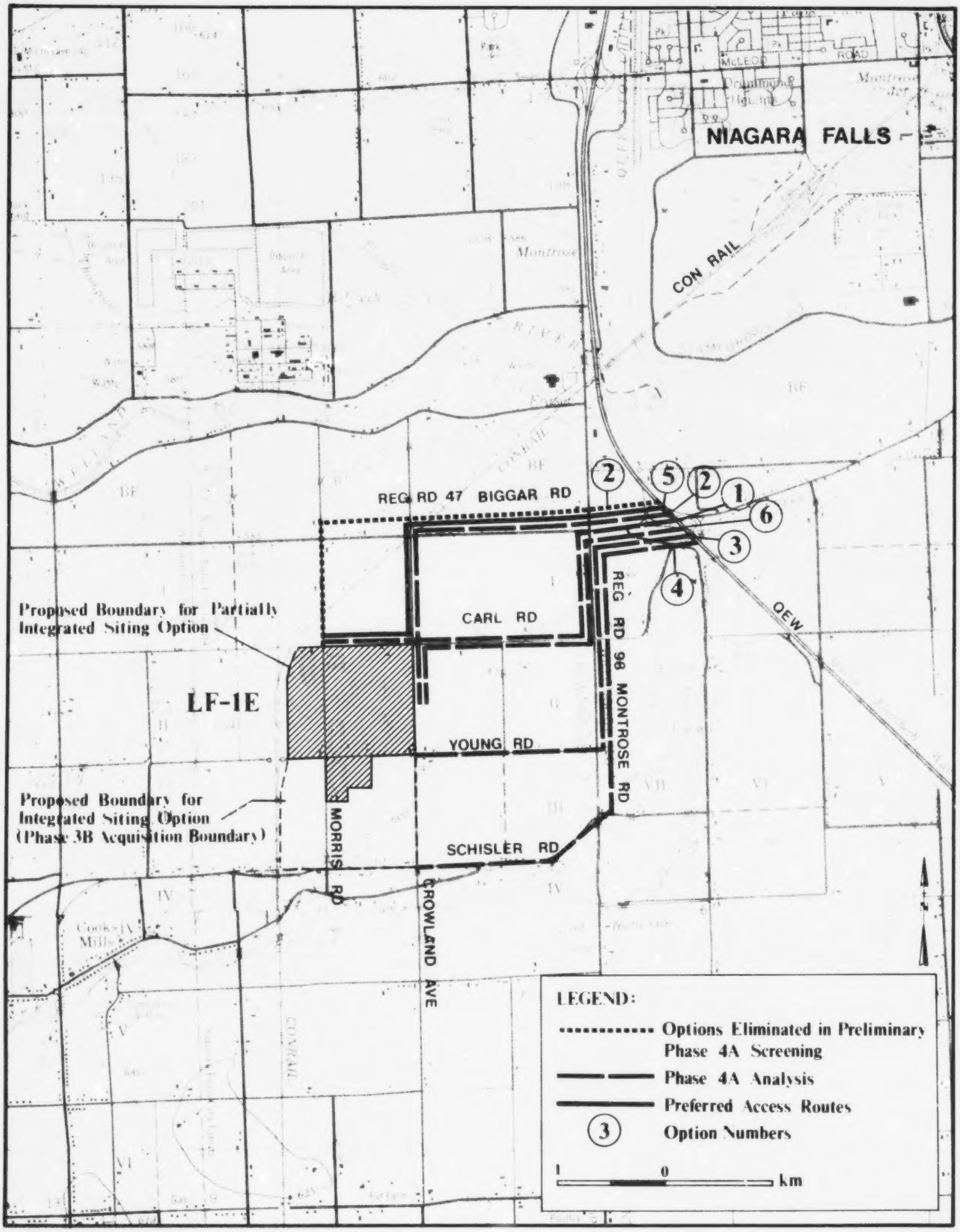
LF-1E /PI-27E
TO PI-27E
PHASE 4A ACCESS ROADS

FIGURE 6.8


NIAGARA FALLS
McLEOD ROAD
Drummond Heights
Montrose Jct
Montrose
PI-27E
LF-1E
REG RD 47 BIGGAR RD
REG RD 98 MONTROSE RD
CARL RD
YOUNG RD
SCHISLER RD
MORRIS RD
CROWLAND AVE
QEW
1
2
3
4
5
6
Proposed Boundary for Partially Integrated Siting Option
Proposed Boundary for Integrated Siting Option (Phase 3B Acquisition Boundary)
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
3 Option Numbers
1 0 1 km

LF-1E/ PI-27E
PI - 27E TO LF - 1E
PHASE 4A ACCESS ROADS

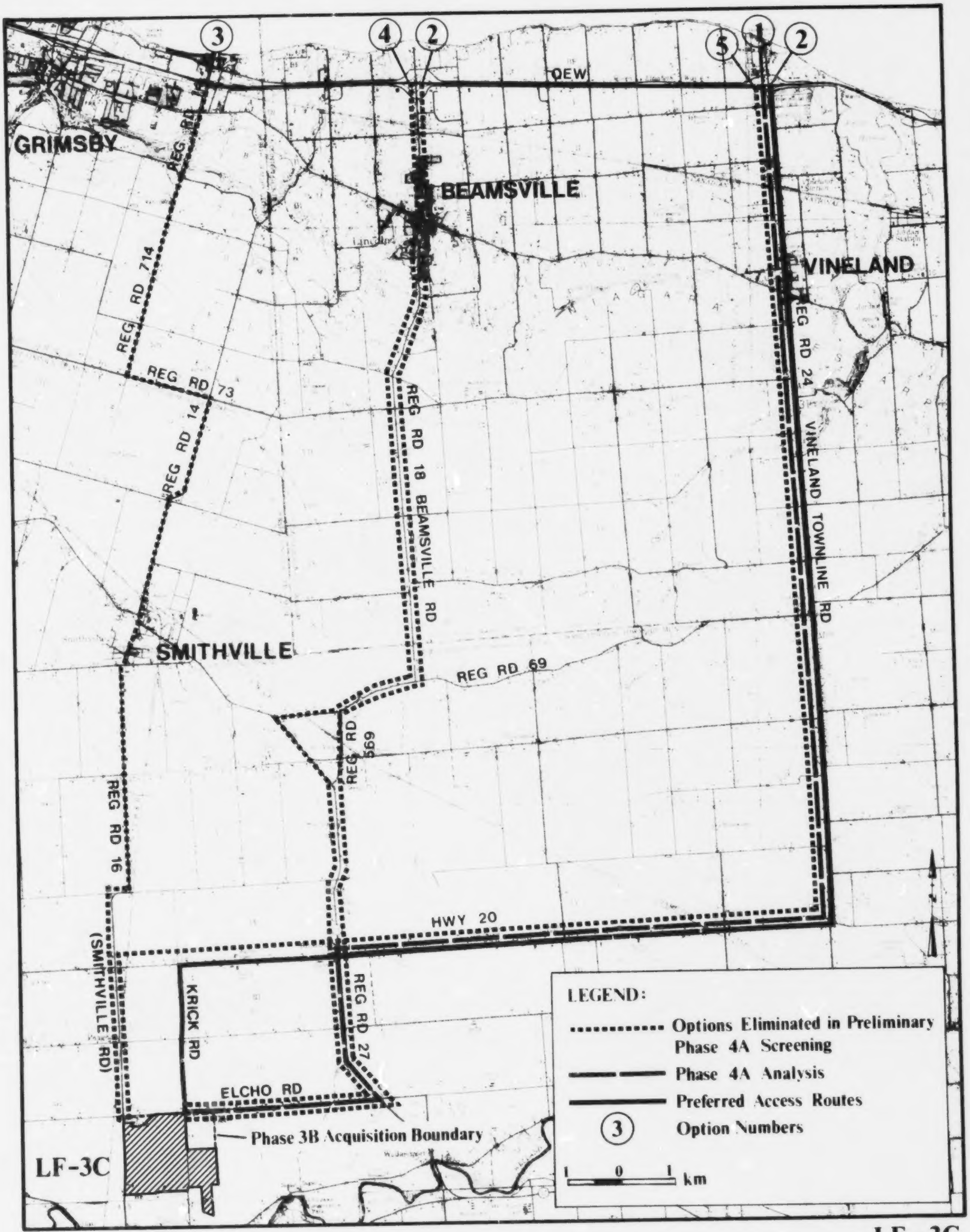
FIGURE 6.9


NIAGARA FALLS
McLEOD
ROAD
Drummond Heights
Montrose Jct
CON RAIL
Montrose
REG RD 47 BIGGAR RD
CARL RD
YOUNG RD
SCHISLER RD
REG RD 98 MONTROSE RD
MORRIS RD
CROWLAND AVE
OEW
LF-1E
Cooks Mills
CONRAIL
1
2
3
4
5
6
Proposed Boundary for Partially Integrated Siting Option
Proposed Boundary for Integrated Siting Option (Phase 3B Acquisition Boundary)
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
Option Numbers
1 0 km

LF-1E

PHASE 4A ACCESS ROADS

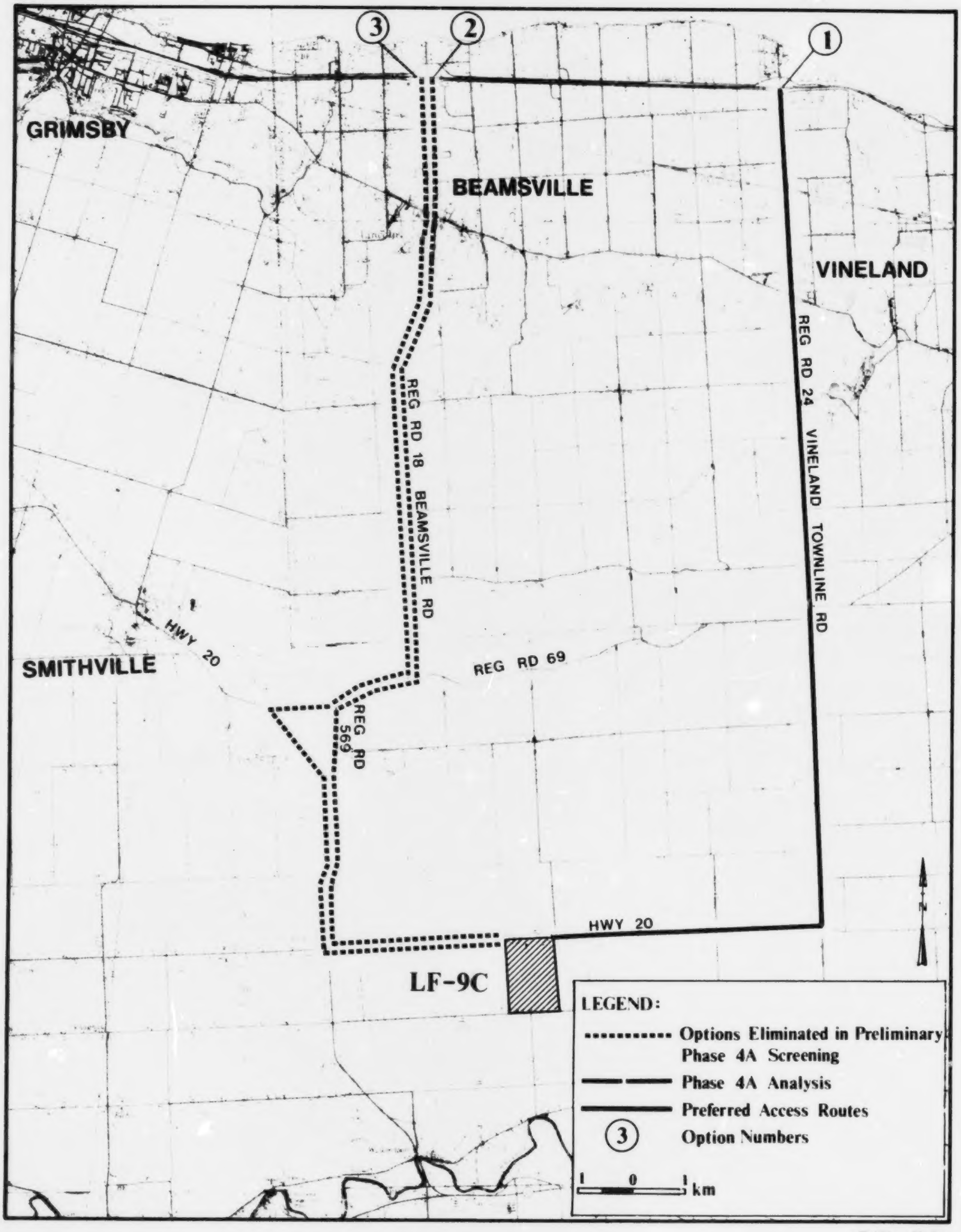
FIGURE 6.10


③
④
②
⑤
①
②
QEW
GRIMSBY
BEAMSVILLE
VINELAND
SMITHVILLE
REG RD 714
REG RD 14
REG RD 73
REG RD 18 BEAMSVILLE RD
REG RD 24 VINELAND TOWNLINE RD
REG RD 69
REG RD 569
REG RD 16 (SMITHVILLE RD)
HWY 20
KRICK RD
REG RD 27
ELCHO RD
Phase 3B Acquisition Boundary
LF-3C
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
③ Option Numbers
1 0 1 km

LF-3C

**PHASE 4A ACCESS ROADS**

**FIGURE 6.11**


③
②
①
GRIMSBY
BEAMSVILLE
VINELAND
REG RD 18 BEAMSVILLE RD
REG RD 24 VINELAND TOWNLINE RD
HWY 20
SMITHVILLE
REG RD 69
REG RD 569
HWY 20
N
LF-9C
LEGEND:
Options Eliminated in Preliminary Phase 4A Screening
Phase 4A Analysis
Preferred Access Routes
③ Option Numbers
1 0 1 km

LF-9C

PHASE 4A ACCESS ROADS

FIGURE 6.12

# CHAPTER 7

## LOCATION OF PHYSICAL/CHEMICAL TREATMENT PLANT FOR PARTIALLY INTEGRATED SITING OPTIONS

### 7.1 INTRODUCTION

For each of the three partially integrated siting options[1] (PI13N/LF4N, PI1N/LF4N, PI27E/LF1E), two facility combinations are possible:

Case 2[2]: the physical/chemical treatment plant and incinerator situated on the PI site and the landfill on the LF site;

Case 3[2]: the incinerator situated on the PI site and the physical/chemical treatment plant and landfill on the LF site.

---

[1] At this stage in Phase 4A, it was determined by the hydrogeologic consultant that the site LF2N failed to provide natural containment. Documentation of the rationale for dropping LF2N from further consideration is provided in Gartner Lee Associates Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s) Geologic, Hydrogeologic and Geotechnical Considerations, 1985, and M.M. Dillon Ltd. Site Selection Process, Phase 4A: Interim Site Selection Report. Candidate Site LF2N, 1985. Consequently, the two partially integrated siting options which include this site, PI1N/LF2N and PI13N/LF2N, were dropped from further consideration and do not enter into this and subsequent analyses in Phase 4A.

[2] Case 1 is an integrated siting option, where all three facilities are located on one site. LF1E, LF3C and LF9C are integrated siting options.

Each of the facility components (incinerator, physical/chemical treatment plant and landfill), have specific characteristics,[1] and the potential impacts of a partially integrated siting option will therefore differ between Case 2 and Case 3. The distribution of the facility components between the two sites comprising a partially integrated siting option also affects the number of trucks travelling to each of the sites and between the sites as well as the type of material transported to and between the sites. Figure 7.1 provides a schematic of these interrelationships of the various facility components. Consequently, before comparing the siting options it was necessary to identify the preferred facility combination for each partially integrated siting option. This chapter documents the analysis undertaken of Case 2 and Case 3 and the recommended preference for each partially integrated siting option.

## 7.2 STUDY APPROACH AND ASSUMPTIONS

The distribution of the three facility components (incinerator, physical/chemical treatment plant and landfill) between the two sites comprising a partially integrated siting option affects the potential social impacts off-site and along the access routes. These impacts were considered in comparing the Case 2 and Case 3 options for each partially integrated siting option and are discussed below.

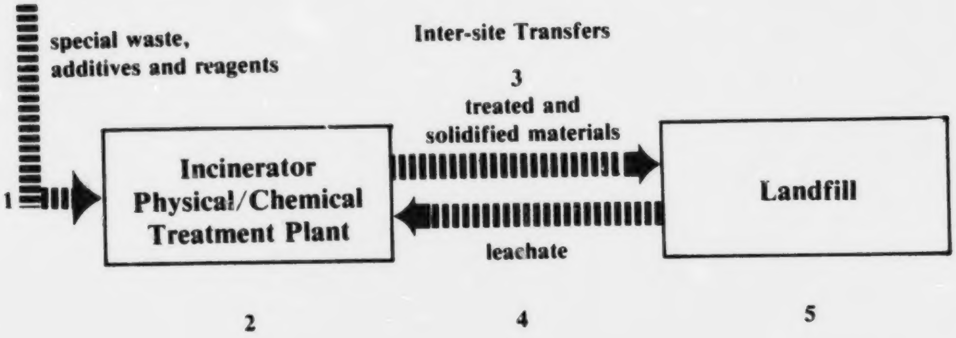
---

[1] Refer to Monenco Limited, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Engineering, 1985 for a discussion of facility characteristics.

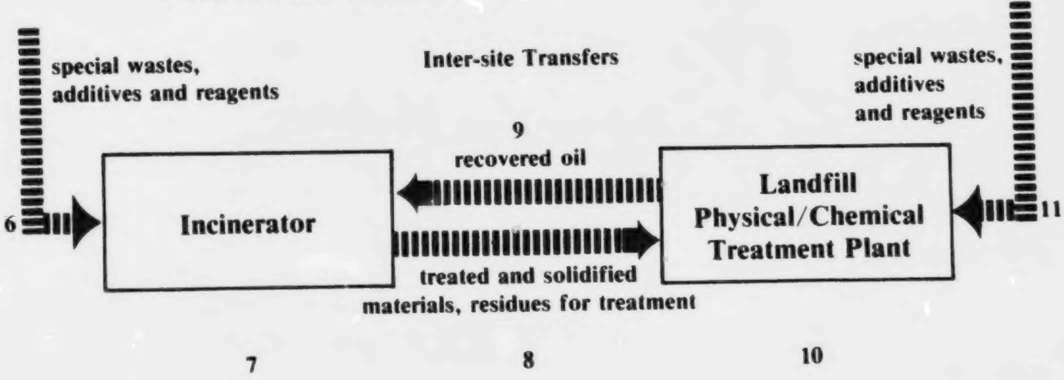
## FIGURE 7.1

## SCHEMATIC OF PARTIALLY INTEGRATED SITING OPTIONS

**OPTION 1:** The physical/chemical treatment plant with the incinerator and the landfill facility on a separate site.


special waste,
additives and reagents
Inter-site Transfers
3
treated and
solidified materials
1
Incinerator
Physical/Chemical
Treatment Plant
Landfill
leachate
2
4
5

**OPTION 2:** The physical/chemical treatment plant with the landfill facility and the incinerator on a separate site.


special wastes,
additives and reagents
Inter-site Transfers
special wastes,
additives
and reagents
9
recovered oil
6
Incinerator
Landfill
Physical/Chemical
Treatment Plant
11
treated and solidified
materials, residues for treatment
7
8
10

## LEGEND

1 = access route for transporting - special waste, additives and reagents to the physical/chemical treatment plant
2 = site of the incinerator and the physical/chemical treatment plant
3 = inter-site transfer route for the treated and solidified materials from the incinerator and physical/chemical treatment plant to the landfill facility
4 = inter-site transfer of leachates from the landfill to the incinerator and physical/chemical treatment plant
5 = site of the landfill facility
6 = access route for transporting special wastes and additives and reagents to the incinerator
7 = incinerator site
8 = inter-site transfer route for transporting treated and solidified materials and residues for treatment from the incinerator to the landfill facility and physical/chemical treatment plant
9 = transfer route for transporting recovered oil from the physical/chemical treatment plant to the incinerator
10 = site of the physical/chemical treatment plant and the landfill facility
11 = access route for transporting special waste, additives and reagents to the physical/chemical treatment plant.

Each of the three facility components have characteristic sound levels associated with their operations. The combination of the facility components within a partially integrated siting option will affect the sound levels off-site and the potential number of residents experiencing an increase in sound levels. The potential disruption of the use and enjoyment of residential properties located in the site vicinity due to the increase in sound levels was considered in comparing the Case 2 and Case 3 options.

The number of trucks along the preferred access routes and inter-site transfer routes for a partially integrated siting option will vary between Case 2 and Case 3.[1] Hence, the sound levels, dust levels and vibrations generated by the truck traffic will vary. The accessibility of residential properties or community and recreation features might also be impacted by variations in traffic volumes. Differences will occur in the movement of wastes between Case 2 and Case 3. In Case 3, untreated wastes will be hauled to both sites rather than the PI site exclusively. In Case 3, it will also be necessary to haul leachate from the landfill to the physical/chemical treatment plant, and to haul solidified waste from the physical/chemical treatment plant to the landfill (See Figure 7.1). Consequently, consideration was given to the potential disruption of residents and features along the access routes in the event of a spill.

The following assumptions were used to guide the application and evaluation of the social factors:

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[1] Refer to M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Transportation, 1985 for a discussion on the truck traffic associated with Case 2 and Case 3.

- the physical/chemical treatment plant and incinerator will operate three shifts a day; the landfill will operate one shift unless it is on a site with a physical/chemical treatment plant in which case it will operate three shifts a day.
- the landfill and physical/chemical treatment plant will operate 5 days a week; the incinerator will operate 7 days a week.
- truck movements to a facility will occur during daytime hours on a five day schedule, Monday through Friday.

M.M. Dillon Ltd. provided the following data:

- noise contours for road traffic and site operations for Case 2 and Case 3
- predicted change in truck volumes on the access route to each site for Case 2 and Case 3

## STUDY AREAS AND IMPACT ZONES

Two impact zones and two study areas were used in the social assessment of the Case 2 and Case 3 facility combinations.

The first impact zone relates to noise generated by the operation of each facility. Noise contour lines around each site for Case 2 and Case 3 were provided by S.S. Wilson and Associates (sub-consultants to the transportation consultant, M.M. Dillon Ltd. see the M.M. Dillon Ltd., Transportation report, 1985). The contour lines permitted the identification of the residential population which would potentially experience sound levels above the Ministry of the Environment (MOE) guidelines.[1] Two contour lines were applied; the 55dBA contour line (MOE daytime guideline) was used for sites on which the landfill only would be located.[2] The 50dBA contour line (MOE nighttime guideline) was applied for the remaining sites as the facilities would operate on a twenty-four hour basis.

---

1. Ministry of Environment Noise Pollution Control Section, Publication NPC-131, "Guidelines for Noise Control in Land Use Planning," Model Municipal Noise Control By-Law, Final Report, August, 1978.
2. When the landfill is located by itself on a site, it would not operate at night. See Section 7.2, Study Approach and Assumptions.

The second impact zone related to truck traffic noise and was applied to the access routes. Noise contour lines were provided along each access route.[1] The lines corresponded to the 55dBA level of sound[2] and were calculated from the centerline of the road. The contour lines permitted the identification of the residential population which could experience sound levels above the MOE guidelines.

Two study areas were used. The residential population and community and recreation features which were defined as adjacent to the access route[3] formed a study area and an 800 metre study area[4] was defined on either side of each access route. It was anticipated that the impacts affecting residents and features adjacent to the access route may be more severe than those further from the route. For this reason, the two study areas of adjacent and 800 metres were identified. These study areas were used to identify the potential differences in nuisance experienced by residents and community and recreation features located along each access route.

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[1] The contour lines were provided by S.S. Wilson and Associates, sub-consultant to M.M. Dillon Ltd.

[2] The trucks were assumed to operate only during daytime working hours.

[3] Adjacent properties are those abutting an access route.

[4] The 800 metre study area along the access routes takes into account the greatest areal extent of impacts in the event of a transportation accident involving volatile substances which was identified as 500 metres on each side of the access routes in Environ, Site Selection Process Phase 4A: Selection of a Preferred Site(s), Generic Risk Assessment, 1985. Within this area, residents and community and recreation features may experience nuisance due to voluntary or forced evacuation. The additional 300 metres provides a margin of safety. Other potential impacts along an access route (i.e. dust, vibration and reduced accessibility) are expected to be contained within 800 metres of an access route. Refer to M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Site Selection, 1985 for a discussion on the assumptions and rationale for the use of this study area.

## 7.3 IDENTIFICATION OF FACTORS AND INDICATORS

The main considerations are the potential disruption of the use and enjoyment of residential properties and disruption of operations of community and recreation features adjacent to the sites and the access routes. The following factors and indicators were applied to compare Case 2 and Case 3.

### DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (site vicinity and access routes).

- Number of residents within the 50dBA and 55dBA noise impact zone. Case 2 and Case 3 facility combinations would create different sound levels in the vicinity of the sites and the access routes. The number of residents within the noise impact zones were identified and used for comparison.

- Impact Index. It is anticipated that the additional truck traffic would potentially reduce the accessibility, real or perceived, to residential properties, adjacent to and up to 800 metres from the access route. Other potential impacts related to truck traffic include dust, vibration and nuisance due to evacuation in the event of an accident. An impact index was used to provide an indication of potential nuisance created by the increased truck volumes. The impact index was calculated on the basis of 1) the number of residents adjacent to the access route and in the 800 metre impact zone of the access route, 2) the predicted change in volume of traffic with the addition of facility associated truck traffic.[1]

---

1. The percentage change in truck traffic volume with the addition of OWMC truck traffic was provided by the transportation consultant, M.M. Dillon Ltd. The access routes were divided into sections or links which correspond to varying traffic volumes along each access route.

### DISRUPTION OF OPERATIONS OF COMMUNITY AND RECREATION FEATURES (access routes)

- Impact Index. The introduction of additional truck traffic to an access route would potentially reduce the accessibility, real or perceived, to community and recreation features adjacent to, and up to 800 metres from, the access route. Other potential impacts include dust, vibration and nuisance due to evacuation in the event of an accident. An impact index was used to provide a measure of potential nuisance due to truck traffic. The impact index was calculated on the basis of, 1) the number of community and recreation features adjacent to each access route and within the 800 metre study area of each access route, 2) the predicted percentage change in the volume of traffic with the addition of facility associated truck traffic.[1]

Additional information on these factors are provided in the factor sheets in Appendix A.

## 7.4 DATA COLLECTION

The following data sources and data were used for the comparison of Case 2 and Case 3 facility combinations for the location of the physical/chemical treatment plant for partially integrated siting options.[2]

- data gathered through field investigations: the field investigations provided the location of community and recreation features adjacent to the access routes and within the access routes' 800 metre study area.
- data from secondary sources: the residential population within the noise impact zone associated with the site was estimated through the use of average household size for the enumeration area (from the 1981 Census) in which the site vicinity is located. The residential population within the access route noise impact zone, adjacent to the access routes and within the access route 800 metre study area was estimated through the use of the average municipal household size

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[1] The percentage change in truck traffic volume with the addition of OWMC truck traffic was provided by the transportation consultant, M.M. Dillon Ltd. The access routes were divided into sections or links which correspond to varying traffic volumes along each access route.

[2] Refer to Chapter 3.0, Data Collection and Analysis for a discussion of the data collection process.

> (from the 1981 Census) in which the access route is located. The location of the residential dwellings in the vicinity of the sites and the access routes were provided by Leon Kentridge Associates Ltd. The location of the noise impact zone associated with the sites and the access routes was provided by S.S. Wilson and Associates, subconsultants to M.M. Dillon Ltd.

Counting the number of residents within an access route noise contour and the number of residents adjacent to, and within 800 metres of, an access route is not double counting. Rather, it provides a measure of cumulative effects, namely, the number of residents potentially affected by increased sound levels (access route noise contour) and the number of residents potentially affected by other impacts such as reduced accessibility, dust, vibration and nuisance effects of forced or voluntary evacuation (800 metre impact zone). Residents potentially affected by all these impacts are clearly impacted to a greater degree than those potentially affected by some impacts.

## 7.5 ANALYSIS

Table 7.1 provides the data, by factor and indicator, used to compare the Case 2 and Case 3 facility combinations for the partially integrated siting options. The Case 2 and Case 3 options for each partially integrated siting option are described in the this section.

## TABLE 7.1
## LOCATION OF PHYSICAL/CHEMICAL TREATMENT PLANT FOR PARTIALLY INTEGRATED SITING OPTIONS

| SITING OPTION/FACILITY COMBINATION[1] | ACCESS ROUTES | | | SITE VICINITY | | |
|---|---|---|---|---|---|---|
| | IMPACT INDEX[2] (RESIDENTS) | | | IMPACT INDEX[2] (COMMUNITY AND RECREATION FEATURES) | | |
| | ADJACENT | 800 METRE STUDY AREA | NUMBER OF RESIDENTS WITHIN 55dBA NOISE IMPACT ZONE[3] | ADJACENT | 800 METRE STUDY AREA | NUMBER OF RESIDENTS WITHIN 50dBA NOISE IMPACT ZONE[3] |
| PI13N/LF4N | | | | | | |
| Case 2 | 455.6 | 381.3 | 839 | 15.5 | 11.3 | 166 |
| Case 3 | 452.3 | 373.1 | 774 | 15.7 | 11.1 | 24 |
| PI1N/LF4N | | | | | | |
| Case 2 | 431.6 | 285.0 | 740 | 14.4 | 10.1 | 98 |
| Case 3 | 432.5 | 286.0 | 694 | 15.7 | 10.1 | 27 |
| PI27E/LF1E | | | | | | |
| Case 2 | 14.1 | 88.9 | 37 | 1.1 | 1.0 | 42 |
| Case 3 | 16.1 | 100.5 | 37 | 1.1 | 1.0 | 32 |

1) The physical/chemical treatment plant is located on the PI site in the Case 2 facility combination. The physical/chemical treatment plant is located on the LF site in Case 3 facility combination.

2) The residential impact index was calculated as follows:

$$\frac{\text{Year 2000 AADT} + \text{OWMC AADT}}{\text{Year 2000 AADT}} \times \text{estimated number of residents}$$

The community and recreation features impact index was calculated as follows:

$$\frac{\text{Year 2000 AADT} + \text{OWMC AADT}}{\text{Year 2000 AADT}} \times \text{number of community and recreation features}$$

The year 2000 AADT and OWMC AADT traffic volumes were provided by M.M. Dillon Ltd. AADT is the annual average daily traffic volume.

3) Noise contour lines were provided by S.S. Wilson & Associates, sub-consultants to the transportation consultants, M.M. Dillon Ltd. The location of residential dwellings within the site vicinities and adjacent to and within 800 metres of each access route were provided by Leon Kentridge Associates Ltd. The average household size, for the enumeration area in which each site vicinity is located and the municipality in which each access route is located, was applied to the dwelling counts for an estimate of residents. The average household size by enumeration area and municipality was obtained from the 1981 Census.

## PI13N/LF4N

Under Case 2, an estimated 839 residents are located within the noise impact zone along the access route. Approximately 224 residents are situated in the noise impact zone associated with sites PI13N and LF4N. The impact index for residents adjacent to the access route is 455.6 and the impact index for residents in the 800 metre study area is 381.3. Community and recreation features impact indices are 15.5 (adjacent to the access route) and 11.3 (800 metre study area of the access route).

The access route noise impact zone associated with the facility combination of Case 3 includes 774 potentially affected residents. An estimated 24 residents are located within the noise impact zones of sites PI13N and LF4N. The resident impact indices for the access routes are 452.3 (adjacent) and 373.1 (800 metre study area). For community and recreation features along the access route, the impact indices are 15.7 (adjacent) and 11.1 (800 metre study area).

## PI1N/LF4N

Approximately 740 residents are within the noise impact zone associated with the access route in Case 2. Under Case 2, an estimated 198 residents around PI1N and LF4N may be affected by sound levels above the Ministry of the Environment guidelines. The impact index for residents adjacent to the access route is 431.6 and for residents within 800 metres of the access route, 285.0. For community and recreation features adjacent to the access route, the impact index is 14.4 and for those within the 800 metre study area the impact index is 10.1.

Under Case 3, 694 residents are estimated to be within the noise impact zone associated with the access route. Twenty-seven residents are identified within the noise impact zone around the two sites. Impact indices of 432.5 and 286.0 were calculated for the residents in the adjacent and 800 metre study areas of the access route respectively. The adjacent and 800 metre study area impact indices for community and recreation features along the access route are 15.7 and 10.1 respectively.

PI27E/LF1E

An estimated 37 residents are located within the access route noise impact zone of Case 2. Approximately 42 people live in the noise impact zones of these two sites. The residential impact indices for the access route are 14.1 (adjacent) and 88.9 (800 metre study area). Community and recreation features impact indices are 1.1 (adjacent) and 1.0 (800 metre study area).

The access route noise impact zone associated with the facility combination of Case 3 would potentially affect 37 residents. An estimated 32 residents are located within the site noise impact zones of PI27E and LF1E. The impact index for residents adjacent to the access route is 16.1 and for residents within 800 metres of the access route, 100.5. For community and recreation features adjacent to the access route, the impact index is 1.1 and for those within the 800 metre study area, the impact index is 1.0.

## 7.6 RANKING AND AGGREGATION OF FACTORS

The Case 2 and Case 3 options for facility combinations were assessed on the basis of the two factors: disruption of day-to-day activities and/or the use and enjoyment of property and the disruption of operations of community and recreation features.

No numerical ranking was assigned to the factors and indicators used. Of the two factors, the potential disruption of community and recreation features was considered less significant than the potential disruption to daily activities of residents.

The indicators for these two factors were assigned different levels of priority. Table 7.2 indicates the priority assigned to the indicators.

A higher priority was assigned to the number of residents within noise impact zones. Within these impact zones it can be reasonably certain that the residents will experience increased noise. The two indicators, number of residents within the site noise impact zones and the number of residents within the access route noise impact zone, were given equal weight.

## TABLE 7.2
## LOCATION OF PHYSICAL CHEMICAL TREATMENT PLANT FOR PARTIALLY INTEGRATED SITING OPTIONS

## WEIGHTING OF FACTORS AND INDICATORS

| FACTOR | INDICATOR | WEIGHTING |
|---|---|---|
| Impact on Residents | | |
| Disruption of Day-to-Day Activities and/or Use and Enjoyment of Properties | • Number of Residents Within 50dBA and 55dBA Noise Impact Zone (Sites) | High Priority |
| | • Number of Residents Within 55dBA Noise Impact Zone (Access Routes) | High Priority |
| | • Impact Index (Adjacent to Access Routes) | Moderately High Priority |
| | • Impact Index (Access Routes 800m Study Area) | Moderate Priority |
| Impact on Community and Recreation Features | | |
| Disruption of Operations of Community and Recreation Features | • Impact Index (Adjacent to Access Routes) | Moderately Low Priority |
| | • Impact Index (Access Route 800m Study Area) | Low Priority |

The impact index provides an indication of other potential impacts (i.e. reduced accessibility, increased dust, vibration and nuisances associated with evacuation). All residents will not experience these potential impacts to the same extent due to varying proximities to the access route. Indeed, some residents may not be affected. For these reasons, the impact indices were given a lower priority than the number of residents within the noise impact zones.

Further, the impact indices for people and features adjacent to the access routes are given higher weight than indices for the 800 metre study area. This is because it is assumed that impacts decline with distance from the access routes.

## 7.7 APPLICATION OF FACTORS: COMPARATIVE EVALUATION

The data provided in Table 7.1 were evaluated in view of the priorities assigned to the factors and indicators. Table 7.3 provides the ranking of Case 2 and Case 3 facility combinations for the three partially integrated siting options and the rationale for the ranking. In all instances, the Case 3 facility combination - the physical/chemical treatment plant and landfill on the LF site and the incinerator on the PI site - is preferred from a social perspective.

### TABLE 7.3
### LOCATION OF PHYSICAL/CHEMICAL TREATMENT PLANT FOR PARTIALLY INTEGRATED SITING OPIONS
### RANKING OF CASE 2 AND CASE 3 FACILITY COMBINATION OPTIONS

| SITING OPTION | FACILITY COMBINATION OPTION | RANKING[1] | RATIONALE |
|---|---|---|---|
| PI13N/LF4N | Case 2 | 2 | • Case 2 has a greater potential noise impact due to a larger number of residents within the site and access route noise impact zones.<br>• Case 2 has a slightly higher impact index for residents adjacent to, and within 800 metres of, the access route.<br>• Case 2 has a slightly higher impact index for community and recreation features within 800 metres of the access route - Case 3 has a slightly higher impact index for features adjacent to the access route.<br>• Case 3 is preferred over Case 2. |
| | Case 3 | 1 | |
| PI1N/LF4N | Case 2 | 2 | • Case 2 has a greater number of residents within the noise impact zone both around the siting option and along the access route.<br>• Case 3 has a slightly higher impact index for residents adjacent to, and within 800 metres of, the access route.<br>• Case 3 has a slightly higher impact index for community and recreation features adjacent to the access route. Cases 2 and 3 have the same impact index for community and recreation features within the 800 metre study area of the access route.<br>• A higher priority was assigned to noise impacts than the impact indices. The impact indices differ only slightly.<br>• Case 3 is preferred over Case 2. |
| | Case 3 | 1 | |
| PI27E/LF1E | Case 2 | 2 | • Case 2 has slightly more residents within the site vicinity noise impact zone than Case 3. The noise impact on residents along the access route is potentially the same for both cases.<br>• Case 3 has a slightly greater impact index associated with residents adjacent to, and within 800 metres of, the access route.<br>• Case 2 and Case 3 have the same impact indices for community and recreation features along the access route.<br>• A higher priority was assigned to noise impacts than the impact indices.<br>• Case 3 is preferred over Case 2. |
| | Case 3 | 1 | |

1. Ranking - 1 = Preferred
2 = Least Preferred

The rankings of Case 2 and Case 3 options in Table 7.3 were used in conjunction with the rankings completed by the other members of the site selection team to identify a preferred facility combination for each of PI13N/LF4N, PI1N/LF4N and PI27E/LF1E. The site selection team selected Case 2 - the incinerator and physical/chemical treatment plant on the PI site and the landfill on the LF site - as the preferred facility combination for these siting options. The rationale behind this preference is documented in the M.M. Dillon Ltd., Site Selection report, 1985.

# PART 3

# COMPARISON OF SITING OPTIONS

# CHAPTER 8

# COMMUNITY CONCERNS AND THE EXISTING ENVIRONMENT

## 8.1 COMMUNITY CONCERNS

In this section of the report we have briefly reviewed major concerns expressed by residents regarding the possible siting of the OWMC facility in their community. These concerns were identified primarily through the Walk and Talk activity administered by IER as well as other Phase 4A public consultation activities. A major reason for investigating community concerns through the survey was to ensure that the factors adopted to compare siting options would deal comprehensively with impacts anticipated by the residents. Of course, many of the expressed concerns deal with issues addressed by other members of the site selection team. Many of the concerns that are relevant to the social impact of the OWMC facility have been addressed in the factors adopted for site comparison. There are concerns, however, that could not be usefully incorporated in the factors because they could not be measured in a form suitable for comparative evaluation and/or they were shared by residents at all sites and were therefore not useful in a relative comparison of potential impacts at the sites. These concerns, which include such things as resident fears that they will not be adequately compensated for property devaluation or other financial losses and the feeling that residents could not influence major events affecting their lives, must be addressed through the policies and procedures OWMC adopts concerning compensation, mitigation and their relationship with the local community. These issues are discussed further in Chapter 10.

The announcement of the candidate sites has placed considerable stress on many individuals and families. The behaviour patterns and lifestyles of many people have been affected by the announcement and the site selection process.

Residents at all the sites worry about the potential effects of the proposed facility should their site be chosen. Some are spending less time with their families as they endeavour to learn more about the proposed hazardous waste treatment and disposal facility and participate in the public consultation program. Some report that the concern with the siting issue and process has affected interpersonal relations and their home lives in general.

Residents noted that since the announcement of the candidate sites they are experiencing uncertainty regarding their lives, homes and in a number of instances, their livelihoods, as well as anxiety and stress. Some individuals have delayed or altered plans for home renovations and property improvement, while others have been unable to follow through with plans to sell.

While most people accept the need for better waste disposal practices and facilities in the province, they question the identification of a site within their municipality. Those residents involved in the study process are sometimes frustrated by the volume of data they must evaluate to understand such a complex siting issue. The residents involved in the study process must deal with time and financial constraints. Amongst some residents there is a sense that the community is involved in a struggle against a government initiative where the public sector can marshall all the resources needed to present its case.

Residents in each of the municipalities have stated their specific concerns and identified the attributes of their communities they feel are threatened. The following sections discuss these concerns and attributes in more detail.

## WEST LINCOLN

The residents in West Lincoln are concerned about potential health risks should a hazardous waste treatment and disposal facility be built. Residents fear that emissions from the incinerator stack could contaminate the rivers (including Beaver Creek and the Welland River) and cisterns used for drinking water by residents and livestock. Another concern is the potential for contamination of surface water and ground water through on-site spills and effluent.

Farmers are concerned that emissions will affect their crops and livestock, notably, milk, tender fruit and grapes and thus be passed through the food chain to the consumers.

Farmers are uneasy about processor and consumer attitudes regarding the impact of a hazardous waste treatment and disposal facility on crops and livestock; they fear negative perceptions may prohibit them from selling their produce.

Residents noted that Regional Road 24 is used by slow-moving farm machinery and school buses. Besides the possibility of injury due to accidents, concern was voiced that spills could contaminate crops along the access route.

Residents expressed the fear that the proposed facilities would attract other industry to the area, which could in turn affect farming and result in the loss of agricultural land.

It was pointed out that heavy ground fog is common along sections of Regional Road 24 and that trucks must travel up a grade to get on top of the Niagara Escarpment. These conditions, particularly in winter, as well as the distance from the centroids of waste production, are seen as increasing the potential for accidents. Residents questioned OWMC's ability to enforce the use of designated access routes.

Residents felt that emergency services in a rural community are inadequate to respond to potential accidents and/or spills that could be associated with hazardous waste treatment and disposal facilities.

Residents feel that it would be a social injustice should either of the West Lincoln sites be chosen. They feel that as an agricultural community, they do not produce hazardous industrial wastes nor have they reaped the benefits associated with industrial areas such as high-paying jobs and the industrial tax base.

The recent publicity over the Smithville PCB storage facility and the selection of a West Lincoln site for a regional landfill facility has heightened the residents' sensitivity to waste issues and in particular, the feeling that their municipality is becoming the waste disposal centre for Ontario. In light of the municipality's lack of industry, this concentration of disposal facilities further exacerbates the sense of injustice.

The residents in West Lincoln view their community as an intensely rural, agricultural area. They see their community as unique in Southern Ontario as the area has remained agricultural since it was first settled. Many generations of families have lived in the area, with farms being passed down from generation to generation.

Farming is characterized as a unique lifestyle. A farm property is home, and place of work, recreation and relaxation. Generally, all members of a farm household contribute to the farming operation in some way. The agricultural associations and the church were identified as centres of community life. In the Walk and Talk survey, the residents identified the main attributes of the community as being the country atmosphere, quiet and privacy, lifestyle and friends and neighbours (see Table 8.1).

## TABLE 8.1
## COMMUNITY ATTRIBUTES BY SITE

| COMMUNITY ATTRIBUTES* | PI13N | PI1N | LF4N |
|---|---|---|---|
| Country Atmosphere | 18% (42) | 20% (38) | 24% (58) |
| Privacy/Quiet | 22% (51) | 21% (40) | 19% (47) |
| Friends/Neighbours | - | - | - |
| Lifestyle | 17% (39) | 15% (28) | 16% (36) |
| Large Open Spaces | - | - | 10% (24) |
| Central Location | 12% (28) | 13% (25) | 15% (36) |

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* Percent of responses and number of responses (in brackets), from survey of residents adjacent to site and in site vicinity; most frequent responses only.

### TABLE 8.1
### COMMUNITY ATTRIBUTES BY SITE

| COMMUNITY ATTRIBUTES* | LF3C | LF9C | LF1E | PI27E |
|---|---|---|---|---|
| Country Atmosphere | 18% (47) | 15% (21) | 14% (34) | 12% (12) |
| Privacy/Quiet | 23% (59) | 24% (34) | 27% (66) | 26% (26) |
| Friends/Neighbours | 12% (31) | 12% (16) | 10% (24) | - |
| Lifestyle | 11% (28.) | 12% (17) | 15% (38) | 19% (19) |
| Large Open Spaces | - | - | - | - |
| Central Location | - | - | 11% (27) | - |

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* Percent of responses and number of responses (in brackets), from survey of residents adjacent to site and in site vicinity; most frequent responses only.

## MILTON

Concerns expressed by Milton site area residents include risk to their health and particularly that of their children. There is concern that the area's rivers and creeks, many of which are water sources for human consumption, livestock, irrigation and recreation will become contaminated. Similarly, potential ground water contamination is a concern. Residents are worried about the potential effects of emissions on people, livestock, crops and the flora and fauna.

Parents are apprehensive about the safety of children on school buses sharing the road with trucks carrying hazardous wastes. The safety of cyclists, joggers and horseback riders who use the roads is also a concern. Injury due to possible spills resulting from traffic accidents are of concern. Residents question how OWMC will police the designated access routes.

Parents and school officials are concerned that if residents leave the area due to the proposed facility, the Percy W. Merry Public School would be forced to close down. Percy W. Merry Public School is the last rural school in the area. Children would have to be bussed to the nearest urban school.

Residents expressed concern that they would not be compensated for reduced property values and loss of lifestyle. In particular, the natural environmental attributes of the area and the view from the Niagara Escarpment were seen as potentially being permanently altered. Further, many persons expressed the view that their property and lifestyle could not be replicated elsewhere.

The residents around the Milton candidate sites (PI1N, LF4N, PI13N) characterize their area as rural agricultural. They see their community as having the advantages of a rural community - quiet, privacy, fresh air - while at the same time providing them with easy access to shopping in Milton, Oakville and Mississauga and easy commuting to work. The area is valued by the residents for its scenic qualities and natural environmental features, including the Sixteen Mile Creek Valley area and Niagara Escarpment (Table 8.1).

### NIAGARA FALLS

The residents in Niagara Falls expressed a wide range of concerns that, in large measure, were similar with those at the other sites. Of particular concern for households were potential health impacts, water quality and property devaluation.

It was noted that the Niagara Falls area has been subject to prolonged and intense concern with environmental issues because of the various toxic substances leaking into the Niagara River and the Great Lakes. Residents cited the experience with Love Canal and the many related waste disposal issues in the northern New York state area, indicating a heightened general awareness of the environmental health issues.

Other concerns noted deal with potential spills and accidents through the Niagara area and particularly along the QEW. Of particular note is the concern for the very high volume of tourist traffic in the spring, summer and fall months and the possible effects of any spill or accident on tourism potential.

The concern for Niagara Falls as a tourist centre was raised prominently and regularly. It was argued that this facility would tarnish the image of Niagara Falls, make it less attractive as a tourist destination and hence affect the economy of the municipality and region. Indeed, it was argued that any major accident could jeopardize the tourism sector of the economy to a point from which it might not recover.

Another theme in the stated concerns is the impact on the agricultural lands and particularly the specialty fruit crops and the grape and wine industry which is of significance in the Niagara Region. The concern was stated in terms of public perception and the likelihood that consumers would not retain confidence in the quality of produce and products from an area containing a major hazardous waste treatment facility.

## 8.2 EXISTING ENVIRONMENT

Information gathered through field investigations, agency contacts, the survey of residents and secondary sources formed the basis of the following summary of existing conditions by siting option. This information was subsequently used to evaluate the potential impacts of the facility by siting option and to identify opportunities for impact mitigation. With the exception of population estimates, the discussion of demographic characteristics is based solely on those households that responded to the resident survey. Detailed data are displayed in Appendix E by siting option and study area.

## PI13N/LF4N

There are an estimated 31 people living on PI13N/LF4N. These residents include six elementary school-aged children.[1] Five (62%) of the respondents own their homes, and two households are engaged in full-time farming. Two households have lived in their homes for more than 20 years and an additional household has lived in Milton for more than 20 years. Several households also have ancestral ties to their property and/or to the community. On-site residents have 21 households of close friends or relatives in the area.[2]

There are an estimated 95 residents adjacent to the site, 28[3] of whom spend most of their time at home. An estimated 959 residents live within the site vicinity.[4] Nine of 55 residents within the daytime noise impact zone spend most of their time at home and six people live within the nighttime noise impact zone.[5] There are 54 residences within the siting option's visual foreground and 123 dwellings within the visual middleground.[6]

Residents in the area surrounding this option primarily use their property for gardening, leisure, and recreational activities. Their concerns

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1. Eight out of ten on-site households responded to the resident survey.
2. The area referred to is delineated by a roughly equal distance around the site(s) encompassing the nearest built-up area.
3. Includes pre-school children (those under 5 years of age), farmers, retirees (those over 65 years of age), housewives, and all others who work at home.
4. Site vicinity includes all properties within an area of roughly 2km around the site, excluding adjacent properties.
5. Depending on the delineation of the noise contours around the site(s), the noise impact zones may include both adjacent and vicinity residents and features. The daytime noise impact zone = 55dBA. The nighttime noise impact zone = 50dBA.
6. The visual foreground includes the area between 0 and 0.8km around the site(s). The visual middleground is the area between 0.8 and 5km around the site(s). However, because the available household data for the area 2 to 5 kilometres from the sites were rough estimates, the visual middleground for this analysis only includes household data in the zone from 0.8 to 2 kilometres from the sites.

regarding the siting of the proposed facility focus on possible pollutants and truck traffic.

On-site features include a historic building and the proposed Glenorchy Conservation Area. There are two community and recreation features adjacent to this siting option, one of which also falls within the noise impact zone. Within the site vicinity there are 16 features.

There are an estimated 481 residents adjacent to the access route, and an additional 347 people living within the access route vicinity.[1] Three hundred and seventy people are estimated to live within the noise impact zone along the route.[2]

There are a total of 16 community and recreation features adjacent to the access route, and an additional 15 within the access route vicinity. Twenty of the features are within the route's noise impact zone.

Considerable population movement in or out of a community is indicative of rapid change and, therefore, a lower level of social stability. A relatively low stability index[3] of 214 for the PI13N/LF4N study area is likely a reflection of substantial population growth in Milton between 1971 and 1981.

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1. Access route vicinity includes all properties within 800 metres along both sides of the route, excluding adjacent properties.
2. Depending on the delineation of the noise contours along the access route, the noise impact zone may include both adjacent and vicinity residents and features.
3. The stability index is a measure of the propensity to change and is calculated as follows: % of households at current address >5 years + % homeowners + % of households whose ancestors owned their property + % of households whose ancestors lived in the municipality.

In this case, newer residents with fewer established ties to the community comprise larger proportions of the general population than in communities with a higher stability index.

The degree of social cohesion among residents is influenced by their participation in community groups and activities. Six households on PI13N/LF4N have one or more members who belong to such groups, and four of these households report associated leadership roles.

The area around PI13N/LF4N is rural residential and agricultural in character. Almost all existing and designated land uses within 2km and 5km of the siting option are non-industrial. These characteristics are consistent with those of the municipality as a whole. Although the Town of Milton includes a growing urban area, the rural ambience of the rest of the municipality has been preserved. This lifestyle has attracted many residents who commute to work in Metro Toronto and Peel Region. It is anticipated, however, that in-migration will decrease and population levels will stabilize in the future.

The proposed site areas are presently characterized by full-time farm operations and hobby farms. More recent demand for rural estate lots, however, is expected to continue. Despite these development pressures, the municipality is committed to protecting the Town's agricultural land and intends to direct rural non-farm development to hamlets throughout the area. Non-noxious industries, which the Town is actively seeking in order to provide local employment opportunities, will continue to be allocated to serviced lands in the urban area. Given these intentions, it is anticipated that Milton will display a continuation of existing trends.[1]

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1. Detailed future scenarios are contained in Appendix F.

## PI1N/LF4N

There are an estimated 34 people living on PI1N/LF4N. These residents include two senior citizens and three elementary school-aged children. All but one (89%) of the respondents[1] own their homes, and none are engaged in full-time farming. Three households have lived in their homes for more than 20 years, and several also have ancestral ties to their property and/or to the community. On-site residents have 12 households of close friends or relatives in the area.

Twenty-three of an estimated 88 residents adjacent to the site spend most of their time at home. An estimated 759 people live within the site vicinity. Nine of the 55 residents within the daytime noise impact zone spend most of their time at home and 15 residents are located within the nighttime noise impact zone. There are 43 dwellings within the siting option's visual foreground and an additional 131 residences within the visual middleground.

Residents in the area surrounding this siting option primarily use their property for leisure activities and gardening. The most frequently expressed concerns about the proposed facility are those regarding water quality, pollution, property devaluation and truck traffic.

On-site features include two historic buildings. One of them, the Tomasky house on PI1N, is designated under the Ontario Heritage Act. There is one feature which is both adjacent to the site and in the noise impact zone. There are 16 features within the site vicinity.

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1. Nine out of eleven on-site households responded to the resident survey.

There are an estimated 435 residents adjacent to the access route, and another 295 people living within the access route vicinity. An estimated 358 residents are also within the noise impact zone. There are 16 community and recreation features adjacent to the access route, and another 12 within the access route vicinity. Twenty features are within the route's noise impact zone.

The rapid population growth in Milton between 1971 and 1981 is reflected in a relatively low stability index of 221. As noted earlier, this suggests that new residents with few established ties to the community comprise larger proportions of the general population than in communities with a higher stability index.

Five on-site households have one or more members who participate in community groups and one of these households reports associated leadership roles.

As is the case with PI13N/LF4N, the general character of this area is rural residential and agricultural and is anticipated to remain so. There is no existing or designated industrial land use within 2km of the site, and only 1% of the designated land use within 2-5km of the site is industrial.

PI27E/LF1E

There are an estimated 42 residents on PI27E/LF1E. These residents include seven senior citizens, four elementary school-aged children, and four housewives. There are three full-time farm households and all but one (92%) of the respondents[1] own their homes. Four households have lived in their homes for more than 20 years, and an additional six have lived in Niagara Falls for more than 20 years. Twelve households reported having ancestral ties to their property and/or to the community. On-site residents have 70 households of close friends or relatives in the area.

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[1] Thirteen out of 15 on-site households responded to the resident survey.

Eleven of an estimated 42 residents living adjacent to the siting option spend most of their time at home. There are an estimated 850 people living within the site vicinity. Nine of 37 residents within the daytime noise impact zone spend most of their time at home and seven people live within the nighttime noise impact zone. Fifteen homes are located within the option's visual foreground and 37 residences are within the visual middleground.

Residents in the area surrounding PI27E/LF1E generally use their property for gardening, leisure, and recreational activities. Their concerns regarding the siting of the proposed facility focus on water quality, property devaluation, possible pollutants, and health risks.

No community or recreation features are located on-site. There are two features adjacent to the site, one of which falls within the noise impact zone. There are 20 features within the site vicinity.

There are an estimated nine people living adjacent to the access route, and 60 residents within the access route vicinity. Six people live within the route's noise impact zone. There is one feature located adjacent to the access route which also falls within the noise impact zone. There are two features within the access route vicinity.

Slow population growth in Niagara Falls between 1971 and 1981 is reflected in a relatively high stability index of 255. Four on-site households have one or more members who participate in community groups and one of these households reports a member in a leadership role.

The immediate area is characterized by a mix of agricultural, rural residential and industrial land uses. Within the 2km study area, none of the existing land uses are industrial, although 23% of the land is designated for industrial development by the Official Plan. Between 2-5km of the siting option, 4% of existing land uses are industrial and 10% are designated industrial.

The Cities of Niagara Falls and Welland are the principal urban centres serving the area. The local economy is based on industry and tourism, and will continue to be so in the future. In the Niagara Region, the recession resulted in high unemployment and out-migration among younger residents. The City of Niagara Falls is actively seeking new industrial development in order to improve the economy. The tourism sector is stable but is expected to provide increasing opportunities for service employment in the future.

Current population growth in Niagara Falls is minimal, and future growth will depend on economic improvements. Any growth that does occur will likely involve increasing urbanization south of the existing built-up area, where PI27E is located. The area containing PI27E is slated for industrial development and LF1E is designated as agriculture.

## LF1E

An estimated 43 people live on LF1E. These residents include four senior citizens and five elementary school-aged children. All but one (93%) of the respondents[1] own their homes and three households are engaged in full-time farming.

Six households have lived in their homes for more than 20 years and an additional four have lived in Niagara Falls for more than 20 years. Ten households also have ancestral ties to their property and/or to the community. On-site residents have 67 households of close friends or relatives in the area.

Six of an estimated 31 residents adjacent to the site spend most of their time at home. An estimated 737 people live within the site vicinity. Six of 21 residents within the daytime noise impact zone spend most of their time at home. Four people live within the nighttime noise impact zone.[2] There are 11 homes within the site's visual foreground and 35 residences within the visual middleground.

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1. Fourteen out of 16 on-site households responded to the resident survey.
2. The number of residents within the noise impact zones may be underestimated. The noise contours were originally determined for the smaller LF1E parcel (consisting largely of the north half of the site). No additional noise contours were developed when the boundaries for the integrated siting option of LF1E were extended to cover the original site acquisition area as identified in Phase 3B. While the entire south portion of LF1E will not be used, the portion that will be used has not been defined. See Monenco Ltd., Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985 and M.M. Dillon, Site Selection Process. Phase 4A: Selection of a Preferred Site(s), - Site Selection, 1985.

Residents in the area surrounding LF1E primarily use their property for gardening, leisure and recreational activities. The most frequently expressed concerns about the proposed facility are those regarding water quality, property devaluation and health risks.

No community or recreation features are located on-site, adjacent to the site or within the noise impact zone. There are 14 features within the site vicinity.

There are an estimated 17 people living adjacent to the access route and an additional 60 residents within the access route vicinity. Seventeen people live within the noise impact zone. There is one feature which is both adjacent to the route and in the noise impact zone. There are two features within the access route vicinity.

Slow population growth in Niagara Falls between 1971 and 1981 is reflected in a relatively high stability index of 251. Six on-site households have a member or members who participate in community groups, and two of these households report individuals in leadership roles.

The immediate area is largely agricultural, with some rural residential land uses. Within the site's 2km study area, none of the existing land uses are industrial and 2% of the land is intended for industrial development. Within 2-5km of the site, 6% of the land uses are industrial and the Official Plan designates 14% of future development as such.

Although LF1E is located within the municipal boundaries of Niagara Falls, future development in the area to the southwest of the site will also be influenced by policies contained in the City of Welland's Official Plan. LF1E is primarily agricultural, and its distance from the Niagara Falls urban area and encroaching non-rural land uses will likely help to retain its character, at least over the short term. The Welland Official Plan intends to restrict future industrial development to designated industrial parks near Cooks Mills, and to encourage residential development on non-agricultural land. With the intention of keeping rural population growth to a minimum, density restrictions will apply to any new rural developments and permitted uses will have to be deemed compatible with the rural environment. Such statements appear to suggest that changes in the area around LF1E are anticipated in the future.

LF3C

An estimated 29 people live on LF3C. These residents include seven elementary school-aged children. Four (67%) of the respondents[1] own their homes and none of the residents operate full-time farms.

Three households have lived in West Lincoln for more than 20 years, and one of these has been in their present home for more than 20 years. Several households also have ancestral ties to their property and/or to the community. On-site residents have 15 households of close friends or relatives in the area.

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[1] All six on-site households responded to the resident survey.

Twenty-three of the estimated 48 people living adjacent to the site spend most of their time at home. An estimated 765 people live within the site vicinity. Six of the 34 residents within the daytime noise impact zone spend most of their time at home and no one lives within the nighttime noise impact zone. There are 16 homes within the site's visual foreground and 42 residences within the visual middleground.

Residents in the area surrounding LF3C primarily use their property for gardening and leisure activities. The most frequently expressed concerns about the proposed facility are those regarding water quality, property devaluation, and pollution.

There are no community or recreation features on-site or adjacent to the site. There are six features within the site vicinity, and two within the noise impact zone.

There are an estimated 993 people living adjacent to the access route, and 1,794 within the access route vicinity. An estimated 1,170 people also live within the route's noise impact zone. There are 18 community and recreation features adjacent to the access route, and an additional 13 within the route's vicinity. Twenty-one features are located within the noise impact zone.

Relatively slow population growth in West Lincoln between 1971 and 1981 is reflected in a moderately high stability index of 238. Five on-site households have a member or members who participate in community groups, and three of these households report individuals in leadership roles.

This site area is rural agricultural in character. Dairy farming is an important component of the local economy. None of the existing and designated land uses within 2km and 5km of the siting option are industrial. These characteristics are consistent with those of the municipality as a whole. The Township of West Lincoln is primarily rural agricultural and this sector of the community is expected to change very little in the future. Growth in the rural area is predicted to be slow but stable. Much of the growth will be in the form of rural non-farm development which the Township hopes to channel into the existing hamlets, not only to strengthen the hamlets, but to protect farmland and reduce servicing costs. Most of the Township's future industrial, residential and commercial development is slated to occur in Smithville.

## LF9C

There are an estimated nine residents on LF9C.[1] These residents include one senior citizen. Both respondent households operate full-time farms, own their homes and have lived there for more than 20 years. On-site residents have four households of close friends or relatives in the area.

There are an estimated 40 residents adjacent to the site, 15 of whom spend most of their time at home. There are an estimated 272 people living within the site vicinity. There are 88 residents within the daytime noise impact zone, 25 of whom spend most of their time at home. Nine people live within the nighttime noise impact zone. Twenty-eight homes are located within the site's visual foreground and 48 are situated within the visual middleground.

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[1] Initially, nine residents were estimated on-site. A subsequent field investigation revealed that there were five residents on-site (one of three on-site dwellings was vacant). While the estimate of nine residents was used in the social analysis, this change in the number of residents does not alter the ranking of the siting options.

Residents in the area surrounding LF9C generally use their property for gardening, leisure, and recreational activities. Their concerns regarding the proposed facility focus on water quality, property devaluation, pollution, and health risks.

There are no community or recreation features on-site, adjacent to the site or within the noise impact zone, but there are two features within the site vicinity.

There are an estimated 775 people living adjacent to the access route, and 1,716 residents within the access route vicinity. An estimated 986 people also live within the route's noise impact zone. There are 14 community and recreation features located adjacent to the access route, and another 11 within the route's vicinity. Seventeen features are within the noise impact zone.

The slow population growth in West Lincoln between 1971 and 1981 is reflected in a relatively high stability index of 254. One on-site household has a member or members who participate in community groups.

As is the case for LF3C, this area is rural agricultural in character. None of the existing and designated land uses within 2km and 5km of the siting option are industrial. The general character of the area is expected to change very little in the future.

# CHAPTER 9

# SITING OPTIONS

## 9.1 INTRODUCTION

Once the components that make up each siting option were defined, the siting options were compared. This chapter documents the social analysis undertaken to compare the siting options.

The analysis of the siting options also identified issues which were not used to compare sites but could contribute to the identification of mitigation and compensation requirements. These issues are discussed in Chapter 10.

Section 9.2 outlines the study approach and assumptions applied in the comparative evaluation of the siting options. The study areas and impact zones used to compare the siting options are also discussed in this section. The indicators and factors used for the analysis and the rationale behind their application are presented in Section 9.3. The data collection process is described in Section 9.4

Section 9.5 outlines the method applied to rank and aggregate the social factors and the rationales for the priorities given to the factors and indicators. The application of the factors is presented in Section 9.6. The siting options are compared for each factor, highlighting the issues associated with each. Construction impacts are addressed in Section 9.7. The potential for mitigation and any implications for the ranking of the siting options are described in Section 9.8.

## 9.2 STUDY APPROACH AND ASSUMPTIONS

The comparison of the siting options began after the facility components had been defined.[1] The following siting options underwent comparative evaluation: PI1N/LF4N; PI13N/LF4N; LF3C; LF9C; LF1E; and PI27E/LF1E.

As recommended by the site selection study team, the partially integrated siting options were compared assuming that the incinerator and physical/chemical treatment plant would be located on the PI site and the landfill on the LF site. PI1N, LF3C and LF1E were compared on the basis of their final site boundaries as delineated during site boundary refinement (see Maps 2, 6 and 7 in Appendix G for these sites' boundaries). The preferred access routes as recommended by the site selection study team were used to compare the siting options. Appendix E identifies the preferred access routes and contains details on data used in the comparative evaluation.

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[1] See M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Site Selection, 1985, for a discussion of decisions regarding the location of physical/chemical treatment plant options, access route options, and boundary refinement.

Factors and indicators as discussed in Chapter 2 were used to analyze the potential impacts. The factors and indicators are discussed in detail in Section 9.3 and Appendix A. Data were collected in order to operationalize the factors and indicators. Concurrent with the data collection and analysis the factors and indicators underwent further internal review including consideration of input received from community groups. In some instances the factors were modified or screened (eliminated) from further use. Section 9.3 describes the factor screening or modifications.

The data associated with the refined social factors are displayed on data matrices. Community and recreation features on-site and in the surrounding area are mapped at a scale of 1:10,000. The data matrices are included in Section 9.6 and the maps are provided in Appendix G. Appendix E contains details on data used in the comparative evaluation.

The projected impacts for the factors and indicators were aggregated in order to permit the ranking of the siting options overall and by factor. This factor aggregation and comparison of the siting options was carried out by using both a numerical weighting system and, where appropriate, a more qualitative evaluation based on professional judgement.

In some instances, a sensitivity test was carried out as a cross-check to the basic analysis. The sensitivity test refers to a subsequent step in the analysis where additional data inputs or modified weightings were used to determine whether or not such adjustments might alter the ranking of the siting options. Thus, the sensitivity test either verified the basic analysis or highlighted some data for consideration in modifying the basic analysis.

The initial comparison of the siting options was conducted assuming no mitigation of potential impacts with the exception of displacement of community and recreation features. The potential for mitigation was then investigated for the social factors and the implications for the ranking of the siting options were reviewed. Section 9.8 discusses mitigation potential.

### 9.2.1 STUDY AREAS AND IMPACT ZONES

In the initial stages of Phase 4A, the site selection study team delineated a study area around each candidate site which was used generally for data collection. The edge of this study area was roughly two kilometres[1] from the centre of each site. In some instances the boundaries were modified to encompass residential areas or communities which lie just outside the original two kilometre boundary. An 800 metre study area[2] was identified along both sides of the access routes. Like the site study area, this access route study area formed the basis for much of the data collection.

Within these data collection study areas other study areas and precise impact zones were defined to facilitate the comparative evaluation of the siting options.

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1. The 2km study area was developed by the site selection team based on levels of impact which might occur. Information available at the time indicated that impacts, including social impacts would be essentially confined to an area of up to 800 metres from the site. The 2km study area takes this into account as well as providing some additional area beyond.
2. See Section 6.3, Comparative Evaluation of Access Route Options, for the rationale for the 800 metre study area.

The study areas and impact zones are listed below.

Study Area

- Site
- Adjacent to Site
- Site Vicinity (2km) excluding adjacent
- Adjacent to Access Route
- Access Route Vicinity (800 metres excluding adjacent)
- Community and Region

Impact Zones

- Noise Impact Zone (site)
- Visual Impact Zones (site)
- Noise Impact Zone (access route)

The impact zones noted above relate to specific impacts, particularly noise and visual intrusion, for which clearly defined zones have been identified. These impact zones have been measured and delineated by other consulting specialists.[1]

It was not possible to identify precise impact areas for a number of other potential impacts such as dust from landfilling operations or reduced accessibility along access roads. As a result, the adjacent and vicinity study areas were used around the sites and access routes as surrogates to ensure consideration of these impacts. Despite these limitations, the analysis involving surrogate study areas were adequate for comparative evaluation purposes.

The study areas and impact zones are discussed below.

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1. Noise impact zones were identified by S.S. Wilson and Associates, subconsultants to the transportation consultant, M.M. Dillon Ltd. EDA Collaborative identified the visual impact zones. (See Institute of Environmental Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 3, Visual Impact Assessment, 1985.)

## Study Areas

### Site

The site acquisition area boundaries of each siting option is defined as the site. This study area relates to the residents and features most likely to be displaced.

### Adjacent

Adjacent properties are those with any boundary or a part of a boundary (i.e., a corner) abutting the site itself or the adjacent roads. Properties separated from a site by a roadway are also considered adjacent.

### Vicinity

The site vicinity includes the area within the two kilometre study area defined for data collection excluding the site and adjacent study areas.

### Access Routes - Adjacent

Adjacent properties are those with any boundary or a part of a boundary (i.e., a corner) abutting the access route.

### Access Routes - Vicinity

The vicinity study area for the access routes encompasses an 800 metre area on both sides of each access route excluding the adjacent study area.

### Community and Region

The factors of social stability, social cohesion and community character relate to a community and regional level of analysis. The study areas applicable to community and region vary by factor. Social stability comprises the site, adjacent to the site, site vicinity and the local municipality. Social cohesion includes the site, adjacent to the site and the site vicinity. Community character draws data from the site, adjacent to the site, the site vicinity (from 0-2km and from 2-5km), from appropriate visual vantage points around the site, and the local municipality.

## Impact Zones

### Noise Impact Zone -Site

Noise impact zones are defined around each site. The noise impact zones are based on noise contour lines provided by S.S. Wilson and Associates, a sub-consultant to M.M. Dillon Ltd.

These zones permitted the identification of the population and community and recreation features which would potentially experience an increase in sound levels above the Ministry of the Environment sound level guidelines.

Two noise impact zones are defined around each site; one relates to estimated daytime sound levels and the second to estimated nighttime sound levels.

Only the daytime noise impact zone is delineated for sites on which the landfill would be the sole facility (LF4N in association with PI13N or PI1N and LF1E with PI27E) as in this instance the landfill is expected to operate only during the daytime.

### Noise Impact Zone - Access Routes

A noise impact zone is delineated on each side of the access routes. This zone applies to daytime sound levels because the delivery of hazardous waste material is expected to take place during daytime working hours. The noise *impact zone permitted the identification of the residential population and community and recreation features which would potentially experience an increase in sound levels above the Ministry of the Environment sound level guidelines.*

### *Visual Impact Zone*

*Two visual impact zones were applied: the foreground (0-0.8 kilometres from the site) and the middleground (0.8-2.0 kilometres from the site). These impact zones are used to identify potential visual intrusion of the proposed waste treatment facilities.*[1]

## *9.2.2 ASSUMPTIONS*

*The following assumptions were used to guide the application and evaluation of the social factors.*

- *the physical/chemical treatment plant would operate five days a week and the incinerator would operate seven days a week; both would operate twenty-four hours a day. The landfill, on a separate site, would operate Monday to Friday, during daytime hours; the landfill in combination with the physical/chemical treatment plant, could operate twenty-four hours a day, five days a week.*
- *truck deliveries of hazardous waste material and other materials to a site were assumed to occur Monday to Friday, during daytime working hours.*
- *minimal odour or lighting impacts were expected to occur off-site (information provided by Ontario Research Foundation (ORF) and Monenco Limited; see Monenco Limited, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Engineering, 1985).*

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[1] *The visual middleground is the area between 0.8 and 5 kilometres around the site(s). However, because the available household data for the area 2 to 5 kilometres around the site(s) were rough estimates, the visual middleground for this analysis only includes household data in the zone from 0.8 to 2 kilometres from the site(s). For the rationale for the visual impact zones, refer to Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices Volume 3, Visual Impact Assessment, 1985.*

- dust impacts were assumed to be essentially contained within the two kilometre study area (information provided by Ontario Research Foundation (ORF) and Monenco Limited; see Monenco Limited, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Engineering, 1985).
- any emissions off-site will meet the Ministry of the Environment standards.
- in-migration of workers and their families during both the construction and operation phases would not be significant enough to create positive or negative impacts for the community and would not affect the ranking of siting options.

## 9.3 IDENTIFICATION OF FACTORS AND INDICATORS

The following discussion outlines how data were used to compare siting options. The rationale for each factor is reviewed. The data required to operationalize relevant indicators and assumptions underlying the analysis are discussed. Constraints in information collection and limitations in the data base are also discussed. Table 9.1 lists all of the factors and indicators used in the analysis. These factors and indicators are described in Appendix A.

Table 9.2 identifies the study areas in which the factors were applied.

Some factors and indicators that had been originally identified were screened from use or eliminated because the data to operationalize them could not be collected, or the available data showed no differences among the siting options. Table 9.3 lists the screened factors and indicators.

The assessment that follows focusses only on the factors and indicators which would reveal differences among the siting options to permit comparative analysis.

### FACTOR GROUPING: IMPACTS ON RESIDENTS

### Factor: Displacement

It was anticipated that the development of a hazardous waste management facility would result in the displacement of residents who live on-site, and along access routes servicing the site. The objective in examining this factor was to determine the potential hardships that displaced residents might experience.

## TABLE 9.1
## FACTOR GROUPINGS, FACTORS AND INDICATORS

### A. IMPACTS ON RESIDENTS

- Displacement
  - Number of residents displaced
  - Characteristics of those displaced
  - Attachment to place of those displaced

- Disruption of Day-to-Day Activities and/or the Use and Enjoyment of Property
  - Number of residents spending most time on properties adjacent to site
  - Number of residents adjacent to site

  - Number of residents spending most time on properties within 55dBA noise impact zone
  - Number of residents within noise impact zone

  - Visual intrusion
  - Number of residents within site vicinity

  - Number of residents (adjacent to access route)
  - Characteristics of residents (adjacent to access route)
  - Number of residents within noise impact zone
  - Number of residents within access route vicinity

### B. IMPACTS ON COMMUNITY AND RECREATION FEATURES

- Displacement
  - Number of features
  - Number of significant features displaced

- Disruption of Operations
  - Number of sensitive features adjacent to site
  - Number of features adjacent to site

  - Number of sensitive features within noise impact zone
  - Number of features within noise impact zone

  - Number of sensitive features within site vicinity
  - Number of features within site vicinity

  - Number of sensitive features adjacent to access route
  - Number of features adjacent to access route

  - Number of sensitive features within noise impact zone (access route)
  - Number of features within noise impact zone (access route)

  - Number of sensitive features within access route vicinity
  - Number of features within access route vicinity

TABLE 9.1 (CONT'D)
FACTOR GROUPINGS, FACTORS AND INDICATORS

## C. IMPACTS ON COMMUNITY AND REGION

- Social Stability
  - Stability index
  - Municipal Growth 1971-1981
  - Disruption through resident displacement
  - Disruption through out-migration
- Social Cohesion
  - Disruption through resident displacement
  - Disruption through out-migration
  - Number of community features contributing to cohesion disrupted
- Community Character/Image
  - Compatibility with land use
  - Heritage features
  - Visual compatibility

# TABLE 9.2
## APPLICATION OF FACTORS BY STUDY AREA

| Factor Grouping/Factor | Site | Adjacent | Vicinity | Access Routes<br>Adjacent | Access Routes<br>Vicinity | Community and Region |
|---|---|---|---|---|---|---|
| Impacts on Residents | | | | | | |
| Displacement[1] | ● | | | | | |
| Disruption of Day-to-Day Activities and/or the Use and Enjoyment of Property | | ● | ● | ● | ● | |
| Impacts on Community and Recreation Features | | | | | | |
| Displacement[1] | ● | | | | | |
| Disruption of Operations | | ● | ● | ● | ● | |
| Impacts on Community and Region | | | | | | |
| Social Stability | | | | | | ● |
| Social Cohesion | | | | | | ● |
| Community Character | | | | | | ● |

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1) Information supplied by M.M. Dillon Ltd. on the extent of road widenings on preferred accesss routes confirmed that no resident or feature displacement would occur. Consequently, these factors were screened or eliminated from the analysis as they relate to access routes.

TABLE 9.3

FACTORS AND INDICATORS SCREENED FROM ANALYSIS

| FACTOR GROUPING | FACTOR | STUDY AREA(s) | INDICATOR(s) | RATIONALE FOR SCREENING |
|---|---|---|---|---|
| Impacts on Residents | Displacement | Adjacent to Access Route | • Number of residents displaced<br>• Characteristics of those displaced<br>• Attachment to place of those displaced | • Information received on the extent of road widenings along potential access routes confirmed that no resident displacement would occur |
| | Disruption of Day-to-Day Activities and/or the Use and Enjoyment of Property | Adjacent to Site and Site Vicinity | • Number and characteristics of residents likely to be affected by facility night lighting and changes in level of odour | • Precise impact zones for odour and facility night lighting could not be determined at this time |
| | | | • Number and kinds of activities or uses of property likely to be affected by facility night lighting and changes in level of odour | • See above |
| | | | • Resident perception of compatibility of facility with their daily activities and use and enjoyment of property | • Data gathered were similar across all sites and therefore not useful for comparison |

TABLE 9.3
FACTORS AND INDICATORS SCREENED FROM ANALYSIS (CONT'D)

| FACTOR GROUPING | FACTOR | STUDY AREA(s) | INDICATOR(s) | RATIONALE FOR SCREENING |
|---|---|---|---|---|
| | | Access Route Vicinity | • Characteristics of residents likely to be affected by truck movements | • Time constraints[1] did not permit the necessary field work (survey) to determine resident characteristics. |
| | | | • Number and kinds of activites or uses of property likely to be affected by facility operations | • Time constraints[1] did not permit the necessary field work (survey) to gather required level of data |
| | Satisfaction With the Community | Site, Adjacent to Site<br>Site Vicinity | • Perceived change in community features which contribute to residents' satisfaction with their community as a place to live | • Data gathered were similar across all sites and, therefore, not useful for comparison |
| Impacts on Community and Recreation Features | Displacement | Site | • Number and characteristics of existing and proposed community and recreation features displaced | • Screening of potential sites in Phase 3B considerably reduced the extent of possible feature displacement. This factor was operationalized but subsequently screened from the analysis since the characteristics of those features remaining on-site are such that displacement impacts can be mitigated |

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1. The data that were gathered for the specific study areas were considered sufficient to make siting option comparisons.

TABLE 9.3
FACTORS AND INDICATORS SCREENED FROM ANALYSIS (CONT'D)

| FACTOR GROUPING | FACTOR | STUDY AREA(s) | INDICATOR(s) | RATIONALE FOR SCREENING |
|---|---|---|---|---|
| | | | • Availability and capacity of alternate services/facilities | • Because the displacement of features can be mitigated, information on alternatives was not gathered |
| | | Adjacent to Access Route | • Number and characteristics of existing and proposed community and recreation features displaced | • Information received on the extent of road widenings along potential access routes confirmed that no feature displacement would occur |
| | | | • Availability and capacity of alternate services/facilities | • Because no features would be displaced, information on alternatives was not gathered |
| | Disruption of Operations | Adjacent to Site and Site Vicinity | • Number and characteristics of community and recreation features likely to be affected by facility night lighting and changes in level of odour | • Precise impact zones for odour and facility night lighting could not be determined at this time |

TABLE 9.3
FACTORS AND INDICATORS SCREENED FROM ANALYSIS (CONT'D)

| FACTOR GROUPING | FACTOR | STUDY AREA(s) | INDICATOR(s) | RATIONALE FOR SCREENING |
|---|---|---|---|---|
| | | | • Change in the use of existing community and recreation features | • Displaced users of community and recreation features could not be identified from data gathered through resident interviews. In addition, the actual extent of out-migration is an unknown variable since it will be based on voluntary decisions by users in relation to facility siting. It is also anticipated that construction workers will commute to the site and that the number of households associated with operations employment that will locate in the host municipality will not significantly affect demand for facilities and services |
| | | Adjacent to Site, Site Vicinity, Adjacent to Access Route, Access Route Vicinity | • Perceived disruptive effects of the facility on community and recreation features | • Operators' comments/concerns were similar and general in nature and therefore, not useful for comparison |

TABLE 9.3
FACTORS AND INDICATORS SCREENED FROM ANALYSIS (CONT'D)

| FACTOR GROUPING | FACTOR | STUDY AREA(s) | INDICATOR(s) | RATIONALE FOR SCREENING |
|---|---|---|---|---|
| Impacts on Community and Region | Social Stability | Site, Adjacent to Site, Site Vicinity, Local Municipality | • Number and characteristics of community organizations and activities that contribute to social stability | • Time constraints[1] did not permit the interviews necessary to gather the data |
| | | | • Community aspirations or desired social change | • Regional and Local Official Plan statements were too general in nature to be useful for comparison. Time constraints did not permit community leader interviews or review of other municipal documents |
| | Social Cohesion | Site, Adjacent to Site, Site Vicinity, Local Municipality | • Number and characteristics of existing and new residents | • It is anticipated that the number of households associated with operations employment that will locate in the host municipality will not be of such magnitude as to alter the existing social patterns |
| | | | • Number and characteristics of community and recreation features that may contribute to social cohesion | • No such features were found to be displaced |
| | Community Character | Adjacent to Site, Site Vicinity (up to 5km), Visual Vantage Points | • Perceived compatibility of the facility with community character | • Data gathered were similar across all sites and, therefore, not use- for comparison |

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1. The data that were gathered for the specific study areas were considered sufficient to make siting option comparisons.

Research[1] in the field of social impacts indicates that hardships associated with residential displacement are likely to be more severe among those segments of the population who, by virtue of their socio-economic characteristics and/or their residential attachments, are less able to adapt to relocation. Information required to operationalize this factor, therefore, included the number of residents displaced, their characteristics and their ties to home and community.

The number of residents displaced provides the starting point for the analysis of this factor since it offers a quantitative, directly comparable measure of impact. As noted above, however, the significance of residential displacement is also a function of the characteristics and attachment to place of those displaced. The elderly, young children, housewives and the poor (i.e., those who lack mobility and/or financial resources) are likely to be more dependent on the immediate community for fulfillment of their material and social needs. Farmers and homeowners generally display a higher degree of "investment" in the community by virtue of the commitments they have made to a particular property. Long-time residents and those with strong local social ties likely display higher levels of attachment to place since time fosters familiarity with the residential environment and allows for the development of social networks. The hardships associated with displacement, therefore, are likely to be greater for these residents than for the general population.

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[1] K. Finsterbusch, A Methodology for Social Impact Assessment of Highway Locations. Interim Report. (Department of Sociology, University of Maryland: July, 1976).
K. Finsterbusch, Understanding Social Impacts: Assessing the Effects of Public Projects. (Beverly Hills, Ca: Sage Publications, 1980).
M. Fried, "Grieving for a Lost Home". Duhl, L.J. (ed.) The Urban Condition. (New York: Basic Books, 1963).

The data required to measure the impacts of resident displacement from the site were collected through the survey of on-site households. Respondents were requested to provide the number of adults and children living in their household. With respect to characteristics of those displaced, the survey included questions on the ages and occupations of all household members, and home ownership. Information on length of residence at the current address and in the municipality, ancestral ties to property and the municipality, and the locations of relatives and close friends in the area was collected in order to develop indicators of attachment to place. Although length of residence at the current address is the accepted measure of attachment to place, it was felt that such attachments might also encompass the broader community and historic ties to property and/or area of residence.

Responses to the number of adults and children in each household were totalled to produce a count of the number of residents displaced.[1] Those residents 65 years of age or older, children between 5 and 13 years of age, housewives, full-time farm households and homeowners were counted and treated as populations most vulnerable to the potential impacts of displacement. Households residing at the current address for more than 20 years and households living in the municipality for more than 20 years, were individually treated as the "length of residence" components of attachment to place. These indicators were supplemented by counts of households with ancestors who had owned the property, households with ancestors who had lived in the municipality, and the numbers of close friends and relatives who currently reside in the area.[1] For all of the above indicators, individuals or households falling into more than one category were counted each time, producing a cumulative measure of potential impacts of displacement.

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[1] Although all on-site households were asked to participate in the survey, some declined to do so. For non-respondents, it was assumed that the relevant enumeration area "average household size" from the 1981 Census would serve as a reasonable substitute for primary data in calculating total residents. For respondents, it was assumed that changes in household size did not occur following the interviews.

Information supplied by the transportation consultant, M.M. Dillon Ltd. on the extent of road widenings on potential access routes indicated that no resident displacement would occur. This factor, therefore, was screened from the analysis.

### Factor: Disruption of day-to-day activites and/or the use and enjoyment of property (Two Kilometre Study Area)

It was anticipated that the operation of a hazardous waste management facility would disrupt the activities and property uses of residents in the vicinity of the site through nuisance effects of increased noise, odour, dust and visual intrusion. The objective in examining this factor was to determine the potential disruptions that vicinity residents might experience.

In order to operationalize this factor, the following data were sought: projected increases in noise, odour, and dust within various impact zones; visual impact; number and characteristics of residents potentially impacted; number and kinds of activities and property uses potentially impacted; resident perception of the effects of anticipated impacts on their day-to-day activities and the enjoyment of their property.

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[1] For all indicators except "number of residents displaced", the absolute numbers shown are based on the survey response only, and did not include an estimate for non-respondents.

No precise impact zones for odour and facility night lighting could be determined at this time. Information received on the potential impacts of odour and visual intrusion indicated minimal off-site effects of odour and facility night-lighting.

Although no precise zone for dust impacts could be delineated, it was determined that such effects would be intermittent and contained well within the 2km study area.[1] Visual impacts will vary with the site. The visual impact zones were delineated by the visual sub-consultant.[2] It was anticipated that increases in noise levels would occur within designated impact zones around the site.[3]

The walk and talk survey focused on two concerns: any unique or unusual property use that might be impacted and resident perceptions of the effects of anticipated impacts on their day-to-day actvities and use and enjoyment of property.

As shown on Table 9.4 the dominant uses of property and activities are very similar across the sites. In addition, resident perceptions of the compatibility of the facility with use and enjoyment of the property were general in nature, and although exhibited some variation across the sites, no clear distinctions are evident.

These data, therefore, were not useful for comparison.

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[1] Information on dust, odour and lighting impacts provided by Ontario Research Foundation (ORF) and Monenco Ltd. See Monenco Limited, Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Engineering, 1985.

[2] Visual impact data provided by EDA Collaborative.

[3] Noise contours provided by S.S. Wilson & Associates, sub-consultant to the transportation consultant, M.M. Dillon Ltd.

## TABLE 9.4
## RESIDENT PROPERTY USES AND CONCERNS BY SITE

| | PI13N | PI1N | LF4N |
|---|---|---|---|
| Number and Kinds of Property Uses and Residents' Activities[1] | | | |
| Leisure/Relaxation/Entertainment | 33% (66) | 30% (51) | 30% (64) |
| Gardening | 29% (58) | 26% (48) | 30% (63) |
| Recreation/Games | 12% (23) | - | 11% (23) |
| Perception of Compatibility With Daily Activity and Uses of Property[1] | | | |
| Water Quality Concerns | - | 13% (43) | 13% (45) |
| Property Devaluation Concerns | 10% (41) | 12% (40) | 11% (41) |
| Pollution Concerns | 12% (51) | 11% (36 | 13% (45) |
| Health Concerns | - | - | - |
| Traffic Concerns | 12% (53) | 12% (41) | 12% (44) |

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1. Percent of responses and number of responses (in brackets), from survey of residents adjacent to site and in site vicinity; most frequent responses only.

TABLE 9.4
RESIDENT PROPERTY USES AND CONCERNS BY SITE (CONT'D)

| | LF3C | LF9C | LF1E | PI27E |
|---|---|---|---|---|
| Number and Kinds of Property Uses and Residents' Activities[1] | | | | |
| Leisure/Relaxation/Entertainment | 33% (74) | 35% (35) | 35% (64) | 32% (33 |
| Gardening | 33% (73) | 32% (32) | 31% (71) | 29% (30) |
| Recreation/Games | 10% (22) | 16% (16) | 11% (26) | 12% (12) |
| Perception of Compatibility With Daily Activity and Uses of Property[1] | | | | |
| Water Quality Concerns | 15% (63) | 11% (28) | 12% (45) | 10% (19) |
| Property Devaluation Concerns | 14% (58) | 14% (34) | 15% (57) | 13% (25) |
| Pollution Concerns | 10% (42) | 13% (33) | - | 12% (23) |
| Health Concerns | - | 12% (29) | 11% (43) | - |
| Traffic Concerns | - | - | - | - |

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1. Percent of responses and number of responses (in brackets), from survey of residents adjacent to site and in site vicinity; most frequent responses only.

Based on the assumption that residents adjacent to the site would be most vulnerable to all potential nuisance effects due to closest proximity, these residents were separated from total residents in the site and access route vicinities and treated separately.

The potential for disruption of at-home activities was considered greatest for residents living adjacent to the site. The total number of people in adjacent households was therefore used as one indicator of impacts. In addition, however, the extent of impact was viewed as a function of duration of exposure to possible nuisances. The potential for housewives, others who work at home, pre-school children and retirees to experience nuisance effects associated with facility operations would be greater due to longer periods of time spent at home. For the first indicator, responses to the survey questions on household members' occupations and childrens' ages were used to identify residents that fall into this category. Despite the fact that other residents spend less time at home, the potential for all adjacent residents to experience disruption would still exist. The number of adults and children living in all adjacent households were totalled for this indicator. These measures are cumulative since those residents spending more time at home were treated both separately and as part of the total population adjacent to the site.

Four indicators were developed in order to measure potential disruption of at-home activities within the site vicinity but beyond the adjacent study area.

Once again, the potential for noise-related disruption was viewed as a function of duration of exposure. The potential for housewives, pre-school children, retirees and others who work at home to experience noise-related nuisance effects would be greater due to longer periods of time spent at home. All residents within the noise impact zone, however, would also be vulnerable to such effects when at home. Responses to the survey questions on household members' occupations and childrens' ages were used to identify those residents in the former category and residing within the daytime noise impact zone. The latter category comprised all vicinity residents within both the daytime and nighttime noise impact zones.

The third indicator consisted of the number of households with a possible view of the facility, divided into two groups: those within the foreground (0-0.8km) and those within the middleground (0.8-2km). These data were calculated and supplied to IER by the visual impact specialists, EDA Collaborative Inc.

The fourth indicator, the number of residents within the site vicinity, was included to account for nuisance impacts for which precise impact zones could not be defined (e.g. dust; intermittent noises). It was also assumed that on rare occasions nuisance effects from forced or voluntary evacuation could occur and that vicinity residents should be considered as being potentially vulnerable to such impacts. For this indicator, the number of vicinity residents was estimated by adding the actual number of residents in responding households to the product of the remaining dwellings (supplied by Leon Kentridge Associates Ltd.) and the relevant enumeration area average household size from the 1981 Census.

### Factor: Disruption of day-to-day activites and/or the use and enjoyment of property (Access Route)

It was anticipated that the operation of a hazardous waste management facility would disrupt the activities and property uses of residents along access routes through nuisance effects of increased noise, increased traffic, and the possible effects of evacuation due to an accident. The objective in examining this factor was to determine the potential disruptions that residents in the vicinity of the access routes might experience.

In order to operationalize this factor, the following data were required: projected increases in noise; projected increases in truck traffic levels; number and characteristics of residents potentially impacted; number and kinds of activities and property uses potentially impacted; resident perception of the effects of anticipated impacts on their day-to-day activities and the enjoyment of their property.

It was anticipated that increases in noise levels would occur within designated impact zones along the access routes.[1] Constraints did not permit the collection of data on the characteristics of residents within access route vicinities and so only those residents immediately adjacent to the routes were surveyed.

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[1] Noise contours supplied by the transportation consultant, M.M. Dillon Ltd.

Based on the assumption that residents adjacent to the access routes would be most vulnerable to all potential nuisance effects due to closest proximity, these residents were separated from total residents in the access road vicinity and treated separately. Consideration of resident perception of the effects of anticipated impacts was screened from further consideration since no significant differences appeared in the responses to questions dealing with property uses. These data, therefore, were not useful for comparison.

Although all residents adjacent to access routes would be potentially vulnerable to nuisances associated with increases in truck traffic, it was anticipated that such concerns would be greater among the elderly and among households with children because of safety concerns. For the first indicator, data from households responding to the access route survey were used to estimate the number of residents under five years of age, between 6 and 15 years old, and over 65 years of age or older. The number of residents adjacent to the access route comprised the second indicator, and included all residents in households responding to the survey and an estimate of the population in non-responding households.[1]

The potential for disruption of at-home activities in the access route vicinity was measured with two indicators - the number of residents within the noise impact zone, and the number of residents within the access route vicinity. The latter indicator was included to account for possible nuisances other than noise, such as possible evacuation and any effects on traffic

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[1] The actual number of residents in responding households was added to an estimate for the remaining households. The estimate was calculated by multiplying the average household size (1981 Census) by the number of households remaining after responding households were subtracted from total dwellings (supplied by Leon Kentridge Associates Ltd.).

*movement and access. As noted previously, the access route survey was limited to adjacent households. Primary data, therefore, were not available for the use in analysis of these factors. It was determined that a reasonable estimate of residents within the noise impact zone could be made by multiplying the number of dwellings located within the zone by the relevant average municipal household size from the 1981 Census. Similarly, the number of residents within the access road vicinity was estimated by multiplying the number of dwellings within the vicinity (supplied to IER by Leon Kentridge Associates Ltd.) by the average household size. In both cases, where the route passed through more than one municipality, sub-totals were calculated for each municipality and then added to produce the total.*

*All of the above indicators were cumulative since residents or households were counted each time a measure applied to them.*

*As a sensitivity test*[1] *on the potential nuisance experienced by residents along the access routes, an impact index was developed by M.M. Dillon Ltd.*

*This index takes into account the predicted change in traffic volumes for each link (or route section) comprising an access route, and the number of residents adjacent to the route and in the access route vicinity. By considering the various links that make up the complete access route and introducing traffic volumes as a measure of the potential nuisance, the index provides a refinement to the indicators, "number of residents adjacent to the access route" and "number of residents within the access route vicinity" and permits identification of any differences that exist among the links that make up an access route.*

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[1] *Sensitivity test refers to a step in analysis where modified data inputs or weights were used to determine whether or not such adjustments might alter the ranking of the siting options.*

Two impact indices were calculated: one impact index was calculated for residents adjacent to the access route and the other for residents in the access route vicinity.

## FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES

### Factor: Displacement

It was anticipated that the development of a hazardous waste management facility would result in the displacement of community and recreation features on-site, and along access routes servicing the site. The objective in examining this factor is to assess potential hardships that both clients and the community might experience due to the displacement of such features.

In order to operationalize this factor, the following data were required: the number and characteristics of existing and proposed community and recreation features on-site and along potential access routes; the availability and capacity of alternate services/facilities to absorb displaced demand.

The number of community and recreation features displaced provided the starting point for the analysis of this factor since it comprised a quantitative, directly comparable measure of impact. The underlying assumption was that potential adverse effects of displacement for both users and the community required to supply alternatives, would increase in proportion to the number of features displaced. The degree of impact, however, is also related to the significance of individual features displaced in terms of number of users, type of user, intensity of use, geographic area served and heritage value.

Information gathered through field investigations, and the survey of owners/operators of community and recreation features on-site and along access routes was used to identify those features that would be displaced and to judge their significance. A feature was to be judged significant if it fulfilled any one of the following criteria: it serves large numbers of people; it serves primarily sensitive users (i.e., children, elderly); it is used regularly; the feature primarily serves local residents; the feature possesses significant heritage value, as assessed by Historica Research Limited.[1]

Based on the foregoing criteria, the number of significant features displaced was weighted separately in the analysis. Proposed features which were under development at the time of the survey, or were scheduled for development in the near future, were treated as existing features.[2] Features for which no information was received were counted in the total number of features but not in the significant category since no judgement regarding their significance could be made.

Screening of potential sites during Phase 3B, considerably reduced the extent of possible displacement on-site. This factor was operationalized but subsequently screened from the analysis since the features remaining on-site were not considered significant and are such that displacement impacts can be mitigated.

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1. See Institute of Environmental Research Inc., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Social Analysis Appendices, Volume 2 - Heritage Assessment, 1985.
2. All other proposed features that did not have a clear timetable for development were screened.

Information supplied by the transportation consultant, M.M. Dillon Ltd. on the extent of road widenings on potential access routes confirmed that no feature displacement would occur. Consequently, this factor was also screened from the analysis with respect to access routes.

**Factor: Disruption of Operations** (Site Vicinity)

It was anticipated that the operation of a hazardous waste management facility would disrupt the operations of community and recreation features in the vicinity of the site. Disruption could occur through the nuisance effects of increased noise, odour, dust and traffic. Such effects could result in a loss of operational effectiveness or perceived image and, subsequently, user demand. Alternately, the in-migration of facility construction workers, employees and their families could produce excessive demand on existing community and recreation features. The objective in examining this factor is to reflect potential disruptions that vicinity features might experience.

In order to operationalize this factor, the following data were required: projected increases in noise, odour and dust within various impact zones; number and characteristics of community and recreation features potentially impacted; anticipated change in demand for facilities and services; owner/operator perception of the effects of anticipated impacts on operations.

Information received on the potential impacts of odour indicated minimal off-site effects.[1] Although no precise zone for dust impacts could be delineated, it was determined that such effects would be intermittent and contained well within the 2km study area.[1] Increased noise was also identified as a potential impact within designated impact zones both off-site and along access routes.[2]

Because specific impact zones could not be delineated for impacts other than noise, the site vicinity and site adjacent study areas were used as surrogates. Based on the assumption that community and recreation features adjacent to the site would be most vulnerable to all potential impacts, these features were isolated from total features in the site vicinity and treated separately.

With respect to anticipated loss of demand for facilities and services, the impacts of residential displacement are negligible to minor in that the number of residents that could be displaced is 43 or less. The actual extent of voluntary out-migration is an unknown variable since it is based on decisions by residents in relation to facility siting. It is possibile that voluntary out-migration coupled with the displacement of some residents could affect the demand for some facilities and services. Some data on the intention to move was generated from the survey which permitted a cursory level of analysis of the effects on facilities and services.

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1. Information on dust and odour impacts provided by Ontario Research Foundation (ORF) and Monenco Ltd. See Monenco Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Engineering, 1985.
2. Noise contours provided by the transportation consultant, M.M. Dillon Ltd.

Information supplied by Clayton Research Associates indicated that 60-125 new households associated with operations employment would locate in the local municipality, depending on the specific site selected. Based on the geographic extent of the municipalities, and on research related to residential location decision-making which shows that proximity to place of employment is not an important factor in residential selection,[1] it is anticipated that only a small proportion of the new households would choose to locate within service areas for local facilities and services. Given that the number of people being displaced is small, the number of people leaving voluntarily is unknown but not considered to be large, and the number of households that would move in to the local area is not considered to be large near the site, it was determined the potential change in demand for facilities and services would be minimal at any of the sites and therefore such considerations were screened from the analysis.[2]

The agencies contacted as part of the walk and talk activity were asked for any comments and concerns that facility and service owners and operators had regarding the proposed facility. In most cases, concerns were similar and general in nature. Since the resulting information could not be used to compare the impacts of siting alternatives, this indicator was also screened from the analysis.

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1. M.A. Stegman, "Accessibility Models and Residential Location." A/P Journal 35 (January 1969): 22-29.
2. It has been assumed that there will be negligible demand made on local facilities and services by the construction work force because it is expected that most of the construction workers will commute on a daily basis.

*Two indicators were used to reflect potential disruption of community and recreation features adjacent to the site and access routes. They are the total number of features and the number of sensitive features.*

*Where possible, information received on feature characteristics was used to determine the number of features which would likely be sensitive to impacts associated with facility operations. Features were categorized using data relating to type of use and/or assumed sensitivity of users. Information on users of community and recreation features varied in terms of both availability and comparability and so professional judgement was relied upon in assessing sensitivity. The number of sensitive adjacent features was given more weight in the analysis.*

*The analysis of potential disruption of community and recreation features within the vicinity of site and access route was based on four indicators.*

*The potential for noise-related disruption was viewed as a function of the sensitivity of features within various impact zones. Community and recreation features with uses that appear incompatible with noise would likely be impacted to a greater degree by such nuisance effects associated with facility and/or trucking operations. All features within noise impact zones, however, could also experience effects of increased noise. Information on feature characteristics and professional judgement were used to identify those features considered sensitive and located within noise impact zones. The second indicator is all community and recreation features within noise impact zones, regardless of their assumed sensitivity to noise.*

The remaining two indicators deal with effects within the site vicinity and the access route vicinity. Other nuisance effects, such as dust, intermittent noises and evacuation, might occur and affect features in the vicinity. Because specific impact zones were not defined for the identified nuisance effects, the site vicinity and access road vicinity study areas were used as surrogates. The third indicator is the number of sensitive features within the site and access route vicinities assessed using available information on the feature's characteristics and our professional judgement and based primarily on the ease with which features could be evacuated in an emergency. Features serving primarily large number of children and elderly are considered the most sensitive. The fourth indicator comprised all features within the vicinity of the site and access routes, regardless of their sensitivity.

In all of the above indicators, proposed features which were under development at the time of the study, or were scheduled for development in the near future were treated as existing features. All other proposed features were screened from the analysis. All of the above indicators were cumulative since features were counted each time a measure applied them.

An impact index was developed for use as a sensitivity analysis of the potential for disruption of operations of community and recreation features. The index was calculated on the basis of 1) the number of community and recreation features adjacent to and within 800 metres of an access route; and, 2) the predicted change in the volume of traffic. Two impact indices were calculated: one for the community and recreation features adjacent to the access route and another for features in the access route vicinity.

Each index takes into account the predicted change in traffic volumes for each link (or route section) comprising an access route, and the number of features adjacent to the route and in the access route vicinity. By considering the various links that make up the complete access route and introducing traffic volume as a measure of nuisance, the index provides a potential refinement to the indicators, "number of community and recreation features adjacent to the access route" and "number of community and recreation features within the access route vicinity" and permits identification of any differences that exist amongst the links that make up an access route.

## FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION

### Factor: Social Stability

Social stability refers to the propensity to change that characterizes the community. It is anticipated that the development of a hazardous waste management facility might cause the community to become unsettled. In anticipation of, or in response to, negative changes in the physical or social environment, residents or owners of community and recreation facilities might become unwilling to invest personal and financial resources in the community, and might decide to leave the area. Such disruption could sever relationships, interactions and activities which contribute to the maintenance of the community's social system. The objective in examining this factor was to reflect the potential impacts of facility siting on social stability.

In order to operationalize this factor, the following data were sought: existing level of stability; rate of population change in the community; potential change in the site vicinity population due to facility siting; community aspirations in terms of desired social change (i.e. to what extent would changes in the community resulting from facility siting be consistent with the community goals).

In order to measure the social stability in the vicinity of each site, (2km study area) the development of a stability measure was necessary. Other social research indicates that social stability is usually a function of length of residence, type of tenure, and type of dwelling unit.[1] Based on these criteria, the following "stability index" was designed to produce a measure of existing social stability:

> percent of households at current address more than 5 years + percent homeowners + percent of households whose ancestors owned property + percent of households whose ancestors lived in municipality.

This equation produces a quantitative, directly comparable indicator of social stability. The percentage of households at the current address for more than five years is a measure of residential turnover, which is a reflection of social continuity. The consideration of households whose ancestors owned their residential properties, and households whose ancestors lived in the municipality is a reflection of historical continuity. Home ownership indicates some level of investment in the community, and implicitly some commitment to remain in the community. Data to operationalize this indicator were taken directly from the survey of residents.

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[1] See Stuart L. Hill and Bamford Frankland. "Mobility as a measure of Neighbourhood." Highway Research Record 187 (1967): 33 - 42. The authors' formula was revised to include measures of ancestral linkages. The percentage of single detached dwellings was excluded since there is no significant difference in types of dwelling units across the candidate sites.

The potential impacts of facility siting on social stability would be greatest in areas with the highest levels of stability. If the residents moving out were long-term residents, their impact would be greater than the moving out of relatively newer residents; and, the loss of residents whose ancestors helped the community was considered to be of greater impact as well.

In addition to examining the existing level of stability, it was useful to consider the rate of population change in the larger community, specifically the municipality. Municipal population growth from 1971 to 1981 was used as a reflection of the municipality's recent experience with change through growth and the municipality's commitment to growth and change. Growth over the ten year period was calculated using Canada Census data. It is assumed the greater the experience with change and the greater the commitment to growth and change, the less would be the impact from the facility siting.

The indicator of potential population change due to facility siting was refined to reflect two levels of disruption. It was anticipated that impacts on existing stability would occur through both displacement and voluntary out-migration of households contributing to the current levels of stability. As noted above, the index used to measure existing stability comprised the sum of four components. It followed, therefore, that each of these components should be examined in relation to resident displacement and possible out-migration. Disruption through resident displacement comprised the following four measures: percent of displaced households at current address more than 5 years; percent of displaced households who were homeowners; percent of displaced households whose ancestors owned the property; percent of displaced households whose ancestors lived in municipality. This information was drawn from responses to the survey of on-site residents.

The same measures were used to analyze the potential effects of voluntary out-migration on social stability: percent of moving households at current address more than 5 years; percent of moving households who were homeowners; percent of moving households whose ancestors owned the property; percent of moving households whose ancestors lived in the municipality.

This information was generated from the Walk and Talk survey and is based on the number of adjacent and vicinity households reporting intentions to move in the event of facility development.[1] Disruption through out-migration was given less weight in the analysis since the actual extent of out-migration will depend on voluntary decisions by households in relation to facility siting and is, therefore, an unknown variable. It was anticipated, however, that disruption through resident displacement and voluntary out-migration together would provide a better reflection of the potential impact of the facility development on social stability.

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[1] In response to an open-ended question on how facility siting might affect their household, some indicated an intention to move. Respondents were not asked specifically whether or not they might move.

It was anticipated that official community documents such as regional and local Official Plans would prove to be valuable in the identification of community aspirations or desires for future change and the possible implications of facility development for these intentions. The degree of compatibility or divergence between explicit goals and objectives, and the type of change that facility siting might initiate would provide a qualitative indicator of potential impacts on stability. The relevant Official Plans, however, contained only general statements and so were not useful for siting option comparisons.

## Factor: Social Cohesion

Social cohesion refers to the level of interaction and degree of interdependence among individuals, groups and institutions in a community. It was anticipated that the development of a hazardous waste management facility might impact the cohesiveness of the community through displacement of residents and community features, disruption of the use of community features and neighbourhood social interaction patterns, and loss of resident attachment to place. The objective in examining this factor was to reflect the potential impacts of the facility on social cohesion.

In order to operationalize this factor, the following data were sought: a measure of the extent of existing neighbouring and social interaction; the number and characteristics of existing and new residents; the number and characteristics of community and recreation features that may contribute to the maintenance of social cohesion that might be displaced or potentially disrupted.

*Three indicators of disruption to the social cohesion in the area were defined: disruption through resident displacement, disruption which might occur as a result of voluntary out-migration, and disruption of features that contribute to social cohesion.*

*The indicator, disruption through resident displacement, is comprised of five sub-indicators: for those displaced, the number of relatives and close friends residing in the area; the number of displaced households with one or more members holding leadership positions in community groups; the number of displaced households with a member or members involved in community groups or organized activities; the number of displaced households with children; the number of children in displaced households. It was anticipated that, together, these measures would provide an indication of the potential loss to both the remaining individuals and the community as a result of resident displacement, and the extent of impact on social cohesion that would be directly related to the displacements. Data for these measures were taken directly from the survey of on-site residents.*

*Based on the same assumptions, similar measures were used to assess the potential effects of voluntary out-migration on social cohesion. The number of moving households with community group leaders, the number of moving households with community group participants, the number of moving households with children, and the number of children in moving households were indicative of the potential loss to the community and individuals. Responses to the survey of residents adjacent to, and in the vicinity of, the site provided the data to operationalize this indicator. Disruption through out-migration,* however, was given less weight in the analysis than disruption through resident displacement because out-migration will depend on voluntary decisions by households in relation to facility siting and is, therefore, less predictable.

Characteristics of the community and recreation features were obtained through the agency contacts and professional judgement was used to identify those features possibly contributing to the maintenance of social cohesion that would be displaced or potentially disrupted by facility siting. Features were considered to be important contributors to social cohesion if they were: primarily local-serving and largely used by the same groups/individuals on a regular basis. It was anticipated that the loss or disruption of features fulfilling these criteria would impact social cohesion by removing or reducing opportunities for personal social interaction among local community residents. No features of this nature, however, were found on-site. Consequently, displacement of features contributing to social cohesion was screened from the analysis.

The same characteristics were used to assess features adjacent to the site and in the site vicinity to determine which features contributing to social cohesion might be disrupted.[1]

As noted previously, 60 to 125 new households associated with operations employment might locate in the local municipality. It is anticipated that their places of residence would not be clustered in any one area. Because of

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1. For four features no information was received, and so no judgement could be made regarding their importance with respect to the disruption of social cohesion. All features for which no judgement regarding cohesion could be made are located within the site vicinity study areas.

the relatively small number of new households, and the expectation that these households will be spread across the municipality it is expected that they will be easily absorbed into the community. Therefore, consideration of their compatibility with existing residents and the subsequent impacts on social cohesion was screened from the analysis.

## Factor: Community Character

Community character refers to the distinctive qualities or attributes of a community which can be physical, socio-cultural or economic in nature. The character of an area is a function of the unique mix of these qualities and as such, there is no single, universally accepted definition of community character.

It was anticipated that the development of a hazardous waste management facility might affect the character of the community by virtue of its potential incompatibility with the existing character. Such a change in the community character might lead residents to be less satisfied with the area as a place to live. The objective in examining this factor was to assess the possible impacts of the facility on community character.

The distinctive qualities or attributes that make up a community's character also contribute to its image. Image is the mental picture or impression one has of a place. The image of a place is based, in part, on the existing land uses and any other special attributes that are widely known or perceived.

Because image is based on perception, and no data were collected dealing with the images of the candidate communities, this analysis is focussed primarily on community charcter and, in particular, aspects that can be comparatively assessed.

Any references to the effects on image are based on the consultant's professional judgement.

The implications of facility development for the community's economic character is assessed separately in Clayton Research Associates Limited, Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Economic Base, 1985a. Likewise, the implications of the facility development on tourism is assessed separately in Institute of Environmental Research Inc., Site Selection Process. Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices, Volume 4 - Tourism Impacts, 1985, prepared by Laventhol & Horwath, and Site Selection Process. Phase 4A: Selection of a Preferred Site(s), Social Analysis Appendices, Volume 5 - Comparative and Parallel Studies of Tourism Impacts, 1985, prepared by J.B. Ellis and Associates.

In order to operationalize this factor, the following information was sought: compatibility of the facility with surrounding land uses, number and type of distinctive community features; visual impact of the facility on community character; perceived compatibility of the facility with community character. In operationalizing this factor, it was assumed that the compatibility of land uses is one element that affects resident satisfaction.

Information on land use, supplied by Leon Kentridge Associates Ltd., was used to assess the potential compatibility of the facility with the area's physical character. Designated land use, as reflected in Official Plans, was considered an indication of future community character and desired development. It was assumed that the degree of compatibility would be inversely related to the amount of non-industrial use, as a percentage of total land use. The percentages of existing and designated non-industrial land uses within 2 and 5 kilometres of the site were calculated. Both existing and future non-industrial land uses, as a percentage of total land use provide quantitative, directly comparable measures of potential compatibility of the facility with community character.

Heritage features and landmarks contribute to an area's character. The sub-indicators required to assess the potential compatibility of the facility with heritage features were developed by the heritage sub-consultant. See Institute of Environmental Research Inc., Site Selection Process. Phase 4A: Selection of a Preferred Site(s), Social Analysis Appendices, Volume 2 - Heritage Assessment, 1985, prepared by Historica Research Limited. Three sub-indicators were developed. For the first, each heritage feature was assigned a score in relation to its significance, and an average heritage value was calculated for the site vicinity. The second comprised the number of heritage features per square kilometre, or the density of structures, within the vicinity. The significance of the overall heritage landscape is the third sub-indicator. The potential incompatibility of the facility with community character is seen as being positively related to the collective values of the heritage sub-indicators.

It is anticipated that the degree of visual compatibility of the facility with the area might also affect non-residents' image of the community. Potential visual compatibility, therefore, was examined with respect to land use and intrusion on passing traffic. This assessment is documented in the Institute of Environmental Research Inc. Appendices, Volume 3 - Visual Impact Assessment, 1985. With respect to land use, existing and future land uses, building types, development patterns and levels of human activity were identified for each site. These criteria were applied to determine the level of potential compatibility between the facility and surrounding land uses. In IER's application, each level was assigned an appropriate numeric value for incorporation into the overall analysis of this factor. The second indicator, intrusion on passing traffic, comprised EDA's analysis of several variables, including traffic counts on nearby roads and highways, and the limits of visibility for passengers and drivers. Analysis of these data produced a ranking of sites, ranging from least intrusion on passing traffic to most intrusion on passing traffic. Application of these results to IER's analysis required the assignment of numeric values to the overall ranking.

The remaining indicator, perceived compatibility of the facility with community character, was screened from the analysis. The information collected through resident surveys and agency contacts showed that most people believe the waste facility would be incompatible with their community and did not display sufficient differences to assist in siting option comparison.

## 9.4 DATA COLLECTION

Data were collected from the following sources for the comparative evaluation of the siting options.[1]

- field investigations of each candidate site and study area to identify community and recreation features.
- field investigations, along each preferred access route to confirm previously collected data and within the 800 metre study area to identify community and recreation features.
- contacts with representatives of community and recreation features to obtain detailed information on the facility's use and users.
- results of the survey of residents and property owners on-site and in the vicinity of each site. The survey provided household profile data and respondents' opinions and concerns regarding the proposed waste treatment and disposal facilities.
- results of a survey of residents living adjacent to the access routes. The survey was designed to obtain a social profile of residents adjacent to the preferred access routes and elicit their concerns about present traffic volumes and increased volumes associated with OWMC's facilities.
- data from secondary sources. Residential population along access routes, and in the 800 metre study areas of access routes were estimated through the use of the average municipal household size, obtained from the 1981 Census. The average household size for the municipality in which an access route is located was applied to the dwelling counts provided by Leon Kentridge Associates Ltd. to estimate the number of residents.

The data obtained through these sources were compiled into Tables 9.6 to 9.18.

The locations of the community and recreation features were mapped at 1:10,000 scale. See Maps 1 to 8 in Appendix G.

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1. Refer to Chapter 3.0, Data Collection and Analysis, for a discussion of the data collection process.

## 9.5 RANKING AND AGGREGATION OF FACTORS

*Following the data collection and analysis, the data were displayed on a series of tables which correspond to each of the social factors (Tables 9.6 to 9.18). While all the social factors are significant, not all are equal in importance. To facilitate the comparison and evaluation of the siting options and ultimately, their ranking, it was necessary to identify the relative importance of the factors. Once the relative importance of the factors is determined, the siting options were reviewed, factor-by-factor, and the factors aggregated for the overall ranking of the siting options.*

### 9.5.1 RATIONALE FOR RANKING OF FACTORS

*The weights assigned to each factor were determined by IER staff. The basic guidelines used in determining the weights were as follows:*

- *Greater weight was given to impacts judged to be of greater severity.*
- *Greater weight was assigned to impacts that are expected to be of longer duration over those that are expected to be occasional and intermittent.*
- *Greater weight was given to impacts that are definite as opposed to those that are less certain.*

*To some extent, the assigned weights also correspond to what was known about each of the sites and possible impacts from earlier stages in the site selection process. For example, through the Phase 3B site selection process, sites with several significant features and large numbers of residents were avoided. Consequently, the weights assigned to the displacement of community and recreation features and displacement of people are lower than might otherwise be anticipated.*

To decide whether impacts are severe, long or short duration, or certain and uncertain, relevant literature was consulted where available.[1] The information from the literature was augmented by the professional judgement and experience of IER staff and other social impact professionals.

Where the weights assigned to indicators and measures dealt with the analysis generated by IER sub-consultants, these weights were determined in collaboration with the sub-consultants.

The weight allotted to each factor was determined by priorizing the factors and assigning to each factor a number of points that, in our judgement, fairly reflected the importance of each factor in relation to all other factors. The most points assigned to a factor is 1500 and the least is 100.

### 9.5.2 WEIGHTING OF FACTORS

The ranking and aggregation of the factors was carried out using a numerical method. The method involves assigning numerical weights among the factors to reflect their relative importance. The following steps were taken to apply the weights and aggregate the factors for an overall ranking of the siting options.

- assign a weight to a factor that reflects its importance relative to the other factors
- the weight assigned to a factor was distributed among the indicators and sub-indicators comprising the factor (see Tables 9.6 to 9.18). The indicators and sub-indicators were considered to have varying levels of significance. The weights that were assigned reflected this.

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[1] See the bibliography for references.

- the data provided for each indicator and sub-indicator shown on Tables 9.6 to 9.18 were scaled. This means that each siting option was ranked relative to the most impacted siting options. The siting option with the greatest impact for an indicator or sub-indicator was assigned a value of 1 and the impacts for all other siting options were calculated as a proportion of 1. The scaled impact values are provided in Tables 9.6 to 9.18.

- once the impacts had been scaled, the pre-determined weights were applied to each indicator or sub-indicator. The scaled impact values under each sub-indicator/indicator were multiplied by the appropriate weight.

- the indicators and sub-indicators for each factor were aggregated by summing the values for the indicators and sub-indicators across each siting option.

- the resulting value represents the overall impact for each siting option for that factor.

- this procedure was repeated for each factor. The factors were aggregated by summing the overall factor impact values derived for each siting option. The resulting values served as the basis from which to determine the relative social ranking for each siting option based on the numerical weights.

A second descriptive method of evaluation was utilized as a cross-check to the numerical method to ensure that qualitative aspects of the social analysis were not lost through the numerical method. This descriptive method is explained in Appendix I along with examples of its application.

## Qualitative Analysis

The numerical analysis focuses on data that can be quantified for comparative purposes. However, not all data can be assessed using the numerical method.

Factors of a broad community and regional nature, such as community character, involve the consideration of qualitative data. In such circumstances, the consultants' professional judgement was relied upon and, where appropriate, adjustments were made to the ranking determined by the numerical method.

The initial factor weights assigned were made available to community groups[1] interested in meeting with IER staff to discuss the weights as well as in the two public workshops hosted by OWMC in July 1985. As a result of these meetings and discussions, some of the factor weights were adjusted. Where they have been adjusted, changes have been noted.

The participants at these workshops were asked to indicate how important each factor was by assigning it a number of points. As a cross-check on the weights assigned by IER, the relative weight that the workshops gave to each factor grouping was compared to the weight assigned by IER. On average, the workshop participants supported and confirmed the priority and relative weight that IER had assigned to the factor groupings.

The factor weights used in the comparative evaluation of the siting options are shown on Table 9.5.

The following section discusses each factor and the weights assigned.

Factor Grouping: Impacts on residents (total weight: 5300)

Factor: Displacement (site) (1200)

Research indicates that the disruption experienced by residents displaced for

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1. Although consideration of the weights by the affected residents is an important component of social impact assessment, no formal opportunities could be arranged. However, the initial weights were discussed with two city staff in Niagara Falls and a few community leaders at the LF3C and LF9C sites in West Lincoln. The leaders of the Milton community groups chose not to meet with us on this issue. The Group of Eight, acting on behalf of the site residents chose not to attend the July workshop. As a result, the only public input to the weights came from the July workshop which were attended by interested individuals from across Ontario but not by residents from the potential sites.
2. See Section 9.3, Identification of Factors and Indicators for a discussion of the research supporting this judgement.

### TABLE 9.5
### PHASE 4A: DETAILED COMPARATIVE EVALUATION
### SITING OPTIONS
### FACTOR WEIGHTING

| FACTOR GROUPING AND FACTOR | STUDY AREA | WEIGHTING |
|---|---|---|
| Impacts on Residents | | |
| Displacement | Site | 1,200 |
| Disruption of Day-to-Day Activities and Use and Enjoyment of Property | Adjacent to Site | 1,500 |
| | Site Vicinity | 1,200 |
| | Adjacent to Access Route | 800 |
| | Vicinity (800 metre impact zone) of Access Route | 600 |
| Impacts on Community and Recreation Features | | |
| Displacement | Site | 200 |
| Disruption of Operations | Adjacent to Site | 300 |
| | Site Vicinity | 200 |
| | Adjacent to Access Route | 150 |
| | Vicinity (800 metre impact zone) of access route | 100 |
| Impacts on Community and Region | | |
| Social Stability | | 800 |
| Social Cohesion | | 400 |
| Community Character | | 800 |

large public facilities is generally greater than the disruption created for those residents left behind. However, past studies that arrived at this conclusion have not dealt with a project such as the siting of a waste management facility. Given the perceived uncertainty and related stress that is associated with the siting and operation of a waste management facility, it was argued by many of those involved in the public consultation workshops that the impact of having to live with such a facility for a prolonged period of time is a greater concern than the impact of displacement. It is recognized that the impact of displacement is of a different type, and although intense, is probably of a shorter duration than the impacts on remaining residents. It was also noted that those displaced will be compensated at market value for the property while those remaining may not be compensated.

As a result, it was decided to assign displacement of residents less weight than the disruption of residents around the site. The displacement of residents is assigned a weight of 1200 points. It was felt that this weighting reflects fairly the potential hardships associated with a non-voluntary move.

Factor: Disruption of day-to-day activities
and the use and enjoyment of property

Study Area: Adjacent to the site (1500)

Residents adjacent to a site were considered to be the most impacted due to the kinds of impacts they would experience and the duration of the impacts. This view was strongly supported at the public workshops which discussed factor weightings. Residents adjacent to a site could be affected by increased sound levels, intermittent noise, truck traffic, dust, visual intrusion, the possibility of evacuation, the potential loss of neighbours (displaced residents), and the less tangible effects related to stress, uncertainty and image. It is considered appropriate to assign a weight to the disruption of daily activities of adjacent residents greater than that assigned to the displacement of residents. A weighting of 1500 is given to the disruption of daily activities of adjacent residents.

### Study Area: Site vicinity (1200)

It is anticipated that residents living in the vicinity of a site beyond those adjacent would experience many of the same impacts as adjacent residents. However, some of the impacts may not be as severe as those felt by adjacent residents. Because the nuisance impacts are expected to diminish with distance from the site, vicinity residents located furthest from a site would likely experience impacts to a lesser degree than those closer to the site. In fact, some of the impacts may not extend over the entire site vicinity, and hence not affect all residents. The kinds and duration of the impacts anticipated were considered by those involved in the public consultation activity to be significant over the operating life of the facility, but of less severity than those affecting the adjacent residents. For these reasons, potential disruption of residents in the site vicinity is given a lower weighting than disruption of adjacent residents but an equal weighting with displacement of residents. A weighting of 1200 is assigned to this factor.

### Study Area: Adjacent to the access route (800)

Potential impacts include increased sound levels and reduced accessibility (real and perceived), and concerns about pedestrian safety, due to the additional truck traffic. Dust, vibration and the possibility of evacuation due to a spill are other possible nuisance impacts. Fewer potential impacts would be experienced by residents adjacent to the access routes than those adjacent to the site. The impacts along the access route would occur primarily during truck delivery hours and so would be intermittent as compared to those affecting residents adjacent to the site. A weighting of 800 is assigned.

Study Area: Access route vicinity (600)
Residents in the vicinity of an access route may experience disruption of their daily activities. The type of potential nuisances are expected to be limited in comparison to those experienced by residents adjacent to the access route. Noise impacts will be experienced by some access route vicinity residents. Other potential impacts include reduced accessibility (real and perceived), concern for pedestrian safety, and the possibility of evacuation. Due to varying proximities to an access route, the vicinity residents will not experience these impacts to the same extent and some residents may not be impacted. For these reasons, this factor is given a weighting of 600 which is lower than the weighting assigned to residents adjacent to the access route.

Factor Grouping: Impacts on community and recreation features (950)
Factor: Displacement (200)
The degree of displacement that would occur on any siting option is minimal; the few features located on the siting options are historic buildings of varying significance. With historic buildings the displacement impacts relate primarily to the loss of structures of historic value; large numbers of regular users are not disrupted or inconvenienced. The displacement of community and recreation features is judged as significantly less important than displacement or disruption of residents. A weight of 200 was initially assigned to displacement of community and recreation features. However, it

was determined that in all cases the possible displacement of heritage features on-site could be mitigated,[1] and since OWMC has expressed a willingness to mitigate any such features, this factor has been screened from the analysis.

Factor: Disruption of operations

Study Area: Adjacent to the site (300)

Due to their proximity to a site, all adjacent features could be impacted. Potential impacts include increased sound levels, truck traffic, visual intrusion, dust, the possibility of evacuation, and image impacts as perceived by the owners/operators and users. The potential disruption from these impacts cannot be measured or predicted with certainty as the degree of disruption depends largely on the decisions of the users and how they respond to the impacts.

Because the type of features adjacent to the site serve the local community and may have sensitive users (i.e., children and elderly), the potential impact of disruption was considered somewhat greater than that of displacement of features but less significant than disruption of residents adjacent to and in the vicinity of the sites and access routes. A weighting of 300 is assigned to this factor.

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[1] The potential for mitigation was considered in the heritage assessment by Historica Research Limited. Refer to Institute of Environmental Research Inc., Site Selection Process. Phase 4A: Selection of a Preferred Site, Social Analaysis, Appendices, Volume 2, Heritage Assessment, 1985.

Study Area: Site vicinity (200)

It is anticipated that community and recreation features in the site vicinity could experience the same type of impacts as adjacent features. However, the impacts are expected to generally be less because the proximity of a community and recreation feature to a site will affect the degree of impact experienced. The potential disruption of the operations of community and recreation features in the site vicinity is given a lower weighting than that for adjacent features. A weight of 200 is assigned.

Study Area: Adjacent to access route (150)

Potential impacts include increased sound levels and reduced accessibility (real and perceived) due to the additional truck traffic, concern for pedestrian safety, the possibility of evacuation, and the image impacts perceived by the owners/operators and users. It is expected that fewer impacts would be experienced by features located adjacent to the access route than those adjacent to the site. This is because the impacts would occur primarily during truck delivery hours (Monday to Friday, during daytime hours),[1] whereas some impacts experienced by features around a site could occur 24 hours a day, seven days a week. For these reasons, a lower weighting is given to the disruption of operations of features adjacent to the access route. A weighting of 150 is assigned.

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[1] Truck delivery hours were provided by M.M. Dillon Ltd. Refer to M.M. Dillon Ltd., Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Transportation, 1985.

*Study Area: Access route vicinity (100)*

*Community and recreation features in the vicinity of an access road could experience some disruption of their operations. It is expected that the features will experience different degrees of impact due to varying proximity This factor is assigned a lower weighting (100) than that assigned to features adjacent to the access route.*

## *Factor Grouping: Impact on Community and Region (2000)*

*Throughout the site selection process, considerable comment was generated from residents near the potential site areas concerning the effects of a hazardous waste management facility on the social structure of the community and the lifestyle of the residents. From the Walk and Talk surveys, the descriptions of the lifestyle and attributes of each of the vicinities surrounding the potential sites were very similar. The characteristics that were valued highly - country atmosphere, rural character, privacy, open spaces, good social environment - showed great similarity across the sites.*

*While one can predict the type of impact that this facility could have on the community as a whole, it is not certain as to what the magnitude of the impacts might be. For most sites the character and image of the immediate area (2km study area) will change and the stability and cohesion will also be affected. However, these are social concepts which are difficult to precisely evaluate because they require prediction of the attitudes and behaviour of the residents, which are, in part, influenced by the attitude and behaviour of OWMC. Therefore, while these kinds of concerns were addressed in the social analysis, these special impacts can only be defined with certainty after the fact.*

*Factor: Social stability* (800)

*Social stability may be impacted through the displacement of residents and decisions made by other residents to move from the area. The degree of disruption cannot be predicted with certainty as it depends partially on the voluntary decisions made by these residents. The impact on stability, while considered important, was given less weight than the disruption of adjacent residents and site vicinity residents. Social stability is assigned a weight of 800.*

*Factor: Social cohesion* (400)

*The social cohesion of an area around a siting option could be impacted by the loss of residents through displacement or voluntary out-migration. The loss of residents could disrupt the interaction patterns among the remaining residents and could also lead to decreased use and possibly a loss of community and recreation features. The actual extent of voluntary out-migration and any resultant disruption to community and recreation features is unknown. This is partly because we are not able to predict who might move into the area to replace those moving out, how they will interact, the degree to which they will involve themselves in community affairs and generally how they will affect social cohesion.*

*Thus while social cohesion is considered an important factor, the data available can be used to only partially assess social cohesion. Consequently, a lower weight (400) is assigned to social cohesion than social stability.*

Factor: Community character (800)

Community character refers to the distinctive attributes of the area as evidenced, in part, by its dominant economic and land use activities. Further, the actions of municipal councils, as evidenced in Official Plans, help to shape the character and image of a municipality and the areas within it. The location of an OWMC facility in an area can have a substantial effect on the character and image of the area and how it is perceived both within the community and from the outside and these changes may have significant social and economic effects. The community character factor is considered to be as important as social stability and as a result, it is assigned a weight of 800.

## 9.6 APPLICATION OF FACTORS: COMPARATIVE EVALUATION

In this section the six siting options are compared by factor.[1] The ranking of the siting options for each factor and the reasons for the ranking are noted. The discussion of each factor should be read in conjunction with the appropriate data matrix, the scaling of impacts table and the overall impact calculations table. See Tables 9.6 to 9.18.

Each of the tables consists of three pages. Each page shows the calculations for a separate step in the comparative evaluation exercise.

The first page displays the data that was used in the analysis, listed vertically from the potentially most to the potentially least impacted siting option.

The second page shows the scaling of the impacts. The scaling ranks the siting options relative to the most impacted option for each of the indicators and sub-indicators. For example, the displacement of residents factor (Table 9.6) shows that facility development on LF1E would displace 43 residents. LF1E, therefore, is the potentially most impacted siting option in terms of number of residents displaced. In the scaling of impacts, the value for LF1E (43) becomes the denominator in the calculation of relative impact for the remaining five siting options and all other values are divided by 43. Using this calculation, LF1E becomes 1.0 and all other options are shown as a proportion of 1.0. Each of the remaining sub-indicators are scaled using the same method.

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[1] The LF2N site (Mississauga) had been dropped from further consideration and so siting options PI1N/LF2N and PI13N/LF2N were not retained for the comparative evaluation.

The last column on the third page displays the results of the overall impact calculation, as applied to the scaling of impacts. The factor weighting, which in this case is 1,200 points, is distributed across all the indicators and sub-indicators. The weighting assigned to any given indicator or sub-indicator is a reflection of the importance attached to this variable in the evaluation of potential impact. The number of residents displaced was assigned 600 points and so becomes the most important indicator within this factor. In the calculation of potential impact for this indicator, the scale value is multiplied by the weight and then divided by 1000 to give an impact value as a proportion of 1.0. For LF1E the impact calculation is 1.0 x 600 divided by 1000 = 0.600. Impact values for each of the remaining sub-indicators are calculated using the same method, but substituting the appropriate weighting. The overall impact for displacement of residents by siting option is then calculated by adding all the indicator and sub-indicator impact values horizontally.

### 9.6.1 COMPARISON OF THE SITING OPTIONS

#### Factor Grouping: Impacts On Residents

#### Factor: Displacement

Impacts on residents through displacement is measured in terms of the number of residents displaced and their characteristics and attachment to place. The data for resident displacement are given in Table 9.6.

The siting option potentially most impacted by displacement is PI27E/LF1E. This siting option has the second highest number of residents on-site (one less than LF1E). These residents are also potentially more impacted due to their characteristics and second most impacted due to their attachment to place than those on any other siting option.

## TABLE 9.6
## DATA MATRIX
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISPLACEMENT (SITE)

| | # OF RESIDENTS DISPLACED[1] | CHARACTERISTICS OF THOSE DISPLACED[2] | | | | | ATTACHMENT TO PLACE OF THOSE DISPLACED[2] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | # of Residents > 65 Yrs. of Age | # of Full-Time Farm Households | % of Dwellings Owned | # of Children 5-13 Yrs. of Age | # of Housewives | # of Households at Current Address > 20 Yrs. | # of Households in Municipality > 20 Yrs. | # of Households With Ancestors Previously Owning Property | # of Households With Ancestors in Municipality | # of Friends in Area | # of Relatives in Area |
| POTENTIALLY MOST IMPACTED | LF1E<br>43 | PI27E/<br>LF1E<br>7 | LF1E<br>PI27E/LF1E<br>3 | LF9C<br>100 | LF3C<br>7 | PI27E/<br>LF1E<br>4 | LF1E<br>6 | LF1E<br>PI27E/<br>LF1E<br>10 | LF1E<br>PI27E/<br>LF1E<br>4 | PI27E/<br>LF1E<br>8 | LF1E<br>35 | PI27E/<br>LF1E<br>38 |
| | PI27E/<br>LF1E<br>42 | LF1E<br>4 | PI13N/<br>LF4N<br>LF9C<br>2 | LF1E<br>93 | PI13N/<br>LF4N<br>6 | LF1E<br>2 | PI27E/<br>LF1E<br>4 | PI1N/<br>LF4N<br>PI13N/<br>LF4N<br>LF3C<br>3 | PI1N/<br>LF4N<br>PI13N/<br>LF4N<br>3 | LF1E<br>6 | PI27E/<br>LF1E<br>32 | LF1E<br>32 |
| | PI1N/<br>LF4N<br>34 | PI1N/<br>LF4N<br>2 | | PI27E/<br>LF1E<br>92 | LF1E<br>5 | PI1N/<br>LF4N<br>PI13N/<br>LF4N<br>LF3C<br>1 | PI1N/<br>LF4N<br>3 | | LF3C<br>1 | PI13N/<br>LF4N<br>PI1N/<br>LF4N<br>LF3C<br>2 | PI13N/<br>LF4N<br>14 | LF3C<br>10 |
| | PI13N/<br>LF4N<br>31 | | | PI1N/<br>LF4N<br>89 | PI27E/<br>LF1E<br>4 | | PI13N/<br>LF4N<br>LF9C<br>2 | | | | PI1N/<br>LF4N<br>11 | PI13N/<br>LF4N<br>7 |
| | LF3C<br>29 | | | LF3C<br>67 | PI1N/<br>LF4N<br>3 | | | | | | LF3C<br>5 | |
| POTENTIALLY LEAST IMPACTED | LF9C<br>9 | PI13N/<br>LF4N<br>LF3C<br>LF9C<br>1 | LF3C<br>PI1N/<br>LF4N<br>0 | PI13N/<br>LF4N<br>62 | LF9C<br>0 | LF9C<br>0 | LF3C<br>1 | LF9C<br>2 | LF9C<br>0 | LF9C<br>0 | LF9C<br>3 | PI1N/<br>LF4N<br>LF9C<br>1 |

1. Number of residents in households responding to resident survey and estimated number of residents in non-responding households.
2. All data taken from survey of residents on-site.

# TABLE 9.6
# SCALING OF IMPACTS
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISPLACEMENT (SITE)

| | # OF RESIDENTS DISPLACED | CHARACTERISTICS OF THOSE DISPLACED | | | | | ATTACHMENT TO PLACE OF THOSE DISPLACED | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | # of Residents > 65 Yrs. of Age | # of Full-Time Farm Households | % of Dwellings Owned | # of Children 5-13 Yrs. of Age | # of Housewives | # of Households at Current Address > 20 Yrs. | # of Households in Municipality > 20 Yrs. | # of Households With Ancestors Previously Owning Property | # of Households With Ancestors in Municipality | # of Friends in Area | # of Relatives in Area |
| PI13N/ LF4N | 0.72 | 0.14 | 0.67 | 0.62 | 0.86 | 0.25 | 0.33 | 0.30 | 0.75 | 0.25 | 0.40 | 0.18 |
| PI1N/ LF4N | 0.79 | 0.29 | - | 0.89 | 0.43 | 0.25 | 0.50 | 0.30 | 0.75 | 0.25 | 0.31 | 0.03 |
| PI27E/ LF1E | 0.98 | 1.0 | 1.0 | 0.92 | 0.57 | 1.0 | 0.67 | 1.0 | 1.0 | 1.0 | 0.91 | 1.0 |
| LF1E | 1.0 | 0.57 | 1.0 | 0.93 | 0.71 | 0.50 | 1.0 | 1.0 | 1.0 | 0.75 | 1.0 | 0.84 |
| LF3C | 0.67 | 0.14 | - | 0.67 | 1.0 | 0.25 | 0.17 | 0.30 | 0.25 | 0.25 | 0.14 | 0.26 |
| LF9C | 0.21 | 0.14 | 0.67 | 1.0 | - | - | 0.33 | 0.20 | - | - | 0.09 | 0.03 |

TABLE 9.6
· OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON RESIDENTS
FACTOR: DISPLACEMENT (SITE)
FACTOR WEIGHTING: 1,200

| | # OF RESIDENTS DISPLACED 600 | CHARACTERISTICS OF THOSE DISPLACED 350 | | | | | ATTACHMENT TO PLACE OF THOSE DISPLACED 250 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | - | # of Residents > 65 Yrs. of Age 80 | # of Full-Time Farm Households 80 | % of Dwellings Owned 80 | # of Children 5-13 Yrs. of Age 55 | # of Housewives 55 | # of Households at Current Address > 20 Yrs. 55 | # of Households in Municipality > 20 Yrs. 45 | # of Households With Ancestors Previously Owning Property 55 | # of Households With Ancestors in Municipality 45 | # of Friends in Area 25 | # of Relatives in Area 25 | OVERALL IMPACT |
| PI13N/ LF4N | 0.432 | 0.011 | 0.054 | 0.050 | 0.047 | 0.014 | 0.018 | 0.014 | 0.041 | 0.011 | 0.010 | 0.005 | 0.707 |
| PI1N/ LF4N | 0.474 | 0.023 | - | 0.071 | 0.024 | 0.014 | 0.028 | 0.014 | 0.041 | 0.011 | 0.008 | 0.001 | 0.709 |
| PI27E/ LF1E | 0.588 | 0.080 | 0.080 | 0.074 | 0.031 | 0.055 | 0.037 | 0.045 | 0.055 | 0.045 | 0.023 | 0.025 | 1.138 |
| LF1E | 0.600 | 0.046 | 0.080 | 0.074 | 0.039 | 0.028 | 0.055 | 0.045 | 0.055 | 0.034 | 0.025 | 0.021 | 1.102 |
| LF3C | 0.402 | 0.011 | - | 0.054 | 0.055 | 0.014 | 0.009 | 0.014 | 0.014 | 0.011 | 0.004 | 0.007 | 0.595 |
| LF9C | 0.126 | 0.011 | 0.054 | 0.080 | - | - | 0.018 | 0.009 | - | - | 0.002 | 0.001 | 0.301 |

LF1E is the second most impacted siting option overall with respect to displacement of residents. LF1E has the greatest number of residents displaced and the second highest number of residents with characteristics which indicate greater impacts for LF1E than at other sites. The highest potential impact for attachment to place was calculated for residents living on LF1E.

Siting option PI1N/LF4N is impacted to a lesser degree than LF1E. This siting option has the third highest number of residents displaced and is ranked third overall.

PI13N/LF4N has the fourth highest number of residents on-site, and it is the fourth most impacted siting option overall with respect to displacement of residents. PI13N/LF4N is only slightly less impacted than PI1N/LF4N.

LF3C is the second least potentially impacted siting option in terms of the number of residents on-site and the overall impact of displacement of residents.

The potentially least impacted siting option in terms of displacement of residents is LF9C. This siting option has the least number of residents presently living on-site[1] and is the least impacted in terms of the residents characteristics and their attachment to place.

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1. Our estimate of the number of residents on-site was 9 and this estimate has been used in all of our analysis. A subsequent site check just prior to the OWMC announcement of the preferred site has determined that there are 5 residents on-site. This change in the number of residents on-site, however, does not affect the ranking of the siting options.

## Factor: Disruption of day-to-day activities and/or the use and enjoyment of property

Study Area: Adjacent to site

Two indicators contribute to the measurement of this factor. They are the number of residents adjacent to the site and the number of residents spending most time at home during the day on properties adjacent to the site. The data and calculations for this factor are given in Table 9.7.

PI13N/LF4N is the most impacted siting option with respect to this factor. The greatest number of residents live adjacent to PI13N/LF4N. This siting option also has the greatest number of people who are at home during the day.

PI1N/LF4N is the second most impacted siting option. There are slightly fewer residents adjacent to PI1N/LF4N and slightly fewer residents at home during the day than there are for PI13N/LF4N.

LF3C is third most impacted in terms of the potential for disruption of day-to-day activities of adjacent residents. There are relatively fewer residents living adjacent to LF3C but the same number of residents who are home during the day on adjacent properties as for the PI1N/LF4N option.

LF9C is less impacted than LF3C. There are fewer people residing adjacent to LF9C as compared to LF3C and fewer residents are at home during the day on properties adjacent to LF9C than for LF3C.

The second least impacted siting option is PI27E/LF1E. A slightly higher number of people live adjacent to this site than LF9C but a lower number of

### TABLE 9.7
### DATA MATRIX
### FACTOR GROUPING: IMPACTS ON RESIDENTS
### FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ADJACENT TO SITE)

| | NO. OF RESIDENTS SPENDING MOST TIME ON PROPERTIES ADJACENT TO SITE[1] | NO. OF RESIDENTS ADJACENT TO SITE[2] |
|---|---|---|
| *Potentially Most Impacted* | PI13N/LF4N<br>28 | PI13N/LF4N<br>95 |
| | PI1N/LF4N<br>23 | PI1N/LF4N<br>88 |
| | LF3C<br>23 | PI27E/LF1E<br>42 |
| | LF9C<br>15 | LF9C<br>40 |
| | PI27E/LF1E<br>11 | LF3C<br>48 |
| *Potentially Least Impacted* | LF1E<br>6 | LF1E<br>31 |

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1. Included in this group are pre-school children (those under 5 years of age), farmers, retirees (those over 65 years of age), housewives and all others who work at home, as provided by respondents to the survey of residents.
2. Number of residents in households responding to socio-economic survey and estimated number of residents in non-responding households.

## TABLE 9.7
## SCALING OF IMPACTS
FACTOR GROUPING: IMPACTS ON RESIDENTS

FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ADJACENT TO SITE)

| | NO. OF RESIDENTS SPENDING MOST TIME ON PROPERTIES ADJACENT TO SITE | NO. OF RESIDENTS ADJACENT TO SITE |
|---|---|---|
| PI13N/LF4N | 1.0 | 1.0 |
| PI1N/LF4N | 0.82 | 0.93 |
| PI27E/LF1E | 0.39 | 0.44 |
| LF1E | 0.21 | 0.33 |
| LF3C | 0.82 | 0.51 |
| LF9C | 0.54 | 0.42 |

TABLE 9.7
OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON RESIDENTS
FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY
(ADJACENT TO SITE)
FACTOR WEIGHTING: 1,500

| INDICATOR WEIGHTING | NO. OF RESIDENTS SPENDING MOST TIME ON PROPERTIES ADJACENT TO SITE 850 | NO. OF RESIDENTS ADJACENT TO SITE 650 | OVERALL IMPACT |
|---|---|---|---|
| PI13N/LF4N | 0.850 | 0.650 | 1.500 |
| PI1N/LF4N | 0.697 | 0.605 | 1.302 |
| PI27E/LF1E | 0.332 | 0.286 | 0.618 |
| LF1E | 0.179 | 0.215 | 0.394 |
| LF3C | 0.697 | 0.332 | 1.029 |
| LF9C | 0.459 | 0.273 | 0.732 |

residents are at home during the day on properties adjacent to this siting option.

LF1E is the least impacted of all siting options for this factor. The fewest number of residents live adjacent to this siting option and the fewest number of residents are at home during the day on adjacent properties.

Study Area: Site vicinity

The potential for disruption to daily activities of residents in the vicinity of the siting options is measured by the number of residents in the daytime (55dBA) and nighttime (50dBA) noise impact zones, number of households within visual impact zones, and total number of residents in the site vicinity. The number of people spending more time on properties within the daytime noise impact zone was given the most weight in the analysis of this factor. Table 9.8 provides the data and calculations for this factor.

PI1N/LF4N is marginally the most impacted of all siting options in terms of disruption of daily activities of residents in the site vicinity. PI1N/LF4N has the most residents in the nighttime noise zone and the second most in the daytime noise zone. It ranks as second most impacted in terms of overall visual intrusion.

PI13N/LF4N is impacted to a slightly lesser degree than PI1N/LF4N. This siting option is the most potentially impacted in terms of visual intrusion and has the largest number of residents in the site vicinity.

LF9C is the third most impacted of all siting options in terms of disruption of daily activities of residents in the site vicinity. LF9C has considerably

TABLE 9.8
DATA MATRIX
FACTOR GROUPING: IMPACTS ON RESIDENTS
FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY
(SITE VICINITY)

| | NO. OF RESIDENTS SPENDING MOST TIME ON PROPERTIES WITHIN 55dBA NOISE IMPACT ZONE[1] | NO. OF RESIDENTS WITHIN NOISE IMPACT ZONE[2] | | VISUAL INTRUSION[3] | | |
|---|---|---|---|---|---|---|
| | | 55dBA | 50 dBA[7] | No. of Households Within Foreground[4] | No. of Households Within Middle-Ground[5] | NO. OF RESIDENTS WITHIN SITE VICINITY[6] |
| Potentially Most Impacted | LF9C<br>25 | LF9C<br>88 | PI1N/LF4N<br>15 | PI13N/LF4N<br>54 | PI1N/LF4N<br>131 | PI13N/LF4N<br>959 |
| | PI1N/LF4N<br>PI13N/LF4N<br>PI27E/LF1E<br>9 | PI13N/LF4N<br>PI1N/LF4N<br>55 | LF9C<br>9 | PI1N/LF4N<br>43 | PI13N/LF4N<br>123 | PI27E/LF1E<br>850 |
| | | PI27E/LF1E<br>37 | PI27E/LF1E<br>7 | LF9C<br>28 | LF9C<br>48 | LF3C<br>765 |
| | | LF3C<br>34 | PI13N/LF4N<br>6 | LF3C .<br>16 | LF3C<br>42 | PI1N/LF4N<br>759 |
| | | | LF1E<br>4 | PI27E/LF1E<br>15 | PI27E/LF1E<br>37 | LF1E<br>737 |
| Potentially Least Impacted | LF3C<br>LF1E*<br>6 | LF1E*<br>21 | LF3C<br>0 | LF1E<br>11 | LF1E<br>35 | LF9C<br>272 |

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1. Includes preschoolers (those under 5 years of age), retirees (those over 65 years of age), farmers, housewives and all others who work at home, as provided by respondents to the survey of residents.
2. Estimate based on number of dwellings within noise impact zone multiplied by enumeration area "average household size" from the 1981 Census.
3. As provided by EDA Collaborative Inc.
4. Foreground: 0-0.8km from the facility.
5. Middleground: 0.8-2km from the facility.
6. Includes all residents in households responding to the survey of residents and an estimate for those in non-responding households.
7. The main contributor to daytime noise around the sites is the landfill operation (55dBA noise impact zone) while the physical/chemical treatment plant and incinerator produce the nighttime sound levels (50 dBA noise impact zone). The sound levels produced by the physical/chemical treatment plant and incinerator are lower than those of the landfill. Hence the 50dBA noise impct zone is closer to the sites and fewer residents are potentiall affected by nighttime noise.

* May be underestimated since no new noise contours were available based on revised site boundaries.

TABLE 9.8
SCALING OF IMPACTS
FACTOR GROUPING: IMPACTS ON RESIDENTS
FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY
(SITE VICINITY)

| | NO. OF RESIDENTS SPENDING MOST TIME ON PROPERTIES WITHIN 55dBA NOISE IMPACT | NO. OF RESIDENTS WITHIN NOISE IMPACT ZONE | | VISUAL INTRUSION | | NO. OF RESIDENTS WITHIN SITE VICINITY |
|---|---|---|---|---|---|---|
| | | 55dBA | 50dBA | No. of Households Within Foreground | No. of Households Within Middle-Ground | |
| PI13N/LF4N | 0.36 | 0.63 | 0.40 | 1.0 | 0.94 | 1.0 |
| PI1N/LF4N | 0.36 | 0.63 | 1.0 | 0.80 | 1.0 | 0.79 |
| PI27E/LF1E | 0.36 | 0.42 | 0.47 | 0.28 | 0.28 | 0.89 |
| LF1E | 0.24 | 0.24 | 0.27 | 0.20 | 0.27 | 0.77 |
| LF3C | 0.24 | 0.39 | - | 0.30 | 0.32 | 0.80 |
| LF9C | 1.0 | 1.0 | 0.60 | 0.52 | 0.37 | 0.28 |

## TABLE 9.8
## OVERALL IMPACT
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (SITE VICINITY)
## FACTOR WEIGHTING: 1,200

| | NO. OF RESIDENTS SPENDING MOST TIME ON PROPERTIES WITHIN 55dBA NOISE IMPACT ZONE | NO. OF RESIDENTS WITHIN IMPACT ZONE | | VISUAL INTRUSION | | NO. OF RESIDENTS WITHIN SITE VICINITY | OVERALL IMPACT |
|---|---|---|---|---|---|---|---|
| INDICATOR WEIGHTING | 350 | 300 | | 250 | | 300 | |
| | | 55dBA | 50dBA | No. of Households Within Foreground | No. of Households Within Middle-Ground | | |
| Sub-Indicator Weighting | | 150 | 150 | 150 | 100 | 300 | |
| PI13N/LF4N | 0.126 | 0.095 | 0.060 | 0.150 | 0.094 | 0.300 | 0.825 |
| PI1N/LF4N | 0.126 | 0.095 | 0.150 | 0.120 | 0.100 | 0.237 | 0.828 |
| PI27E/LF1E | 0.126 | 0.063 | 0.071 | 0.042 | 0.028 | 0.267 | 0.597 |
| LF1E | 0.084 | 0.036 | 0.041 | 0.030 | 0.027 | 0.231 | 0.449 |
| LF3C | 0.084 | 0.059 | - | 0.045 | 0.032 | 0.240 | 0.460 |
| LF9C | 0.350 | 0.150 | 0.090 | 0.078 | 0.037 | 0.084 | 0.789 |

more residents spending most time on their properties within the 55dBA noise impact zone and has the largest number of total residents within the 55dBA zone. This siting option is moderately impacted with respect to visual intrusion. However, LF9C has the least number of residents within the 2km study area.

PI27E/LF1E is fourth most impacted in terms of the potential for disruption of residents in the vicinity. It has the second highest number of residents in the site vicinity but the potential number of residents affected by noise impact and visual intrusion are relatively low as compared to the other siting options.

The second least impacted of all siting options is LF3C. This siting option has relatively fewer residents within the noise impact zones, is third lowest in terms of visual intrusion, and has the third highest number of residents within the site vicinity (the residential population includes the students at the Robert Land Academy).

LF1E is the least impacted of all siting options. This siting option is least impacted in terms of visual intrusion and the second least impacted in terms of noise. A relatively high number of residents live in the vicinity of this siting option.

Study Area: Adjacent to access routes

The potential disruption to daily activities of residents adjacent to the access routes is measured by the number of people living adjacent to the access route and the residents age profile. Table 9.9 provides the data and calculations for this factor.

TABLE 9.9
FACTOR GROUPING: IMPACTS ON RESIDENTS
FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY
(ADJACENT TO ACCESS ROUTE)

| | NUMBER OF RESIDENTS ADJACENT TO ACCESS ROUTE[1] | CHARACTERISTICS OF RESIDENTS[2] | | |
|---|---|---|---|---|
| | | Number 0-5 Years of Age | Number 6-15 Years of Age | Number 65+ Years of Age |
| POTENTIALLY MOST IMPACTED | LF3C<br>993 | LF3C<br>109 | LF3C<br>119 | LF3C<br>129 |
| | LF9C<br>775 | LF9C<br>78 | LF9C<br>85 | LF9C<br>116 |
| | PI13N/LF4N<br>481 | PI1N/LF4N<br>39 | PI1N/LF4N<br>74 | PI13N/LF4N<br>29 |
| | PI1N/LF4N<br>435 | PI13N/LF4N<br>24 | PI13N/LF4N<br>67 | PI1N/LF4N<br>26 |
| | LF1E<br>17 | | | LF1E<br>3 |
| | PI27E/LF1E<br>9 | PI27E/LF1E<br>LF1E<br>0 | PI27E/LF1E<br>LF1E<br>0 | PI27E/LF1E<br>2 |

1) Includes residents in households responding to access route survey and an estimate of residents in non-responding households.

2) Based on responses to resident survey along access routes. The percentage of residents in each group, as reported by responding households has been applied to the estimated number of residents adjacent to the access route to estimate the number of residents 0-5, 6-15 and 65+ years of age.

# TABLE 9.9
# SCALING OF IMPACTS
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ADJACENT TO ACCESS ROUTE)

| | NUMBER OF RESIDENTS ADJACENT TO ACCESS ROUTE | CHARACTERISTICS OF RESIDENTS | | |
|---|---|---|---|---|
| | | % 0-5 years of age | % 6-15 years of age | % 65+ years of age |
| PI13N/LF4N | 0.48 | 0.22 | 0.56 | 0.22 |
| PI1N/LF4N | 0.44 | 0.36 | 0.62 | 0.20 |
| PI27E/LF1E | 0.01 | - | - | 0.02 |
| LF1E | 0.02 | - | - | 0.02 |
| LF3C | 1.0 | 1.0 | 1.0 | 1.0 |
| LF9C | 0.78 | 0.72 | 0.71 | 0.90 |

## TABLE 9.9
## OVERALL IMPACT
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ADJACENT TO ACCESS ROUTE)

| | NUMBER OF RESIDENTS ADJACENT TO ACCESS ROUTE | CHARACTERISTICS OF RESIDENTS | | | OVERALL IMPACT |
|---|---|---|---|---|---|
| INDICATOR WEIGHTING | 500 | 300 | | | |
| | | % 0-5 years of age | % 6-15 years of age | % 65+ years of age | |
| Sub-Indicator Weighting | - | 100 | 100 | 100 | |
| PI13N/LF4N | 0.240 | 0.022 | 0.056 | 0.022 | 0.340 |
| PI1N/LF4N | 0.220 | 0.036 | 0.062 | 0.020 | 0.338 |
| PI27E/LF1E | 0.005 | - | - | 0.002 | 0.007 |
| LF1E | 0.010 | - | - | 0.002 | 0.012 |
| LF3C | 0.500 | 0.10 | 0.10 | 0.10 | 0.800 |
| LF9C | 0.390 | 0.072 | 0.071 | 0.090 | 0.623 |

The potential impact on residents living adjacent to access routes is greatest for LF3C. The access route to this siting option has the greatest number of adjacent residents. The route to LF3C also has the greatest proportion of adjacent residents whose age characteristics could make them potentially more sensitive to the increase in truck traffic.

The potential impact of residents living adjacent to the LF9C access route is the second highest. The access route has the second highest number of adjacent residents. As well, LF9C has the second highest number of residents whose age characteristics could make them potentially more sensitive to increased truck traffic.

PI1N/LF4N and PI13N/LF4N are almost equally impacted. PI1N/LF4N has the third highest number of children and the fourth highest number of senior citizens adjacent to the access route. The PI1N/LF4N access route has the fourth highest number of adjacent residents. The PI13N/LF4N access route has the third highest number of adjacent residents, and the fourth highest number of children living adjacent to the access route. It has the third highest number of senior citizens adjacent to the access route.

The second least impacted siting option is LF1E. The LF1E access route has the second lowest number of adjacent residents. The LF1E siting option (along with PI27E/LF1E) has no children and the lowest number of senior citizens living adjacent to the access route.

PI27E/LF1E is the least impacted siting option on this factor. It has the least number of residents adjacent to the access route, and the lowest number of age sensitive residents.

The residential impact index,[1] used as a sensitivity cross-check, indicates the same ranking of the siting options as that of the indicator "number of residents adjacent to the access route". Therefore, no change is warranted in the overall ranking of the siting options for this factor. The residential impact index calculations are provided in Appendix E.

Study Area: Access route vicinity

The potential disruption to daily activities of residents within the 800 metre impact zone of the access routes is measured by the number of residents within both the noise impact zone and the access route vicinity. Table 9.10 provides the data and calculations.

The highest potential impact in the access route vicinity is on LF3C. This access route has the highest number of residents in the vicinity and the highest number of residents within the noise impact zone.

LF9C is ranked as the second highest potentially impacted siting option. The second highest number of residents in the access route vicinity and in the noise impact zone are associated with LF9C.

PI13N/LF4N and PI1N/LF4N are the third and fourth most impacted respectively, in terms of impacts on residents in the access route vicinity.

Considerably less potential impact is measured for siting options PI27E/LF1E and LF1E. PI27E/LF1E is marginally less impacted than LF1E. Both siting option access routes have the same number of residents in the vicinity; LF1E has more residents within the noise impact zone.

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[1] The residential impact index is described in Section 9.3.

### TABLE 9.10
### DATA MATRIX
### FACTOR GROUPING: IMPACTS ON RESIDENTS
### FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ACCESS ROUTE VICINITY)

| | NO. OF RESIDENTS WITHIN NOISE IMPACT ZONE[1] | NO. OF RESIDENTS WITHIN ACCESS ROUTE VICINITY[2] |
|---|---|---|
| Potentially Most Impacted | LF3C 1,170<br>LF9C 986 | LF3C 1,794<br>LF9C 1,716 |
| | PI13N/LF4N<br>370 | PI13N/LF4N<br>347 |
| | PI1N/LF4N<br>358 | PI1N/LF4N<br>295 |
| | LF1E[3]<br>17 | |
| Potentially Least Impacted | PI27E/LF1E[3]<br>6 | LF1E; PI27E/LF1E<br>60 |

1. Estimate based on number of dwellings within noise impact zone multiplied by municipal "average household size" from 1981 Census.
2. Estimate based on dwelling counts (supplied by Leon Kentridge Associates Ltd.) multiplied by municipal "average household size" from 1981 Census.
3. The noise calculations used in this analysis maximizes the number of residents potentially exposed to increased noise levels. If the more conservative method (as described in the text) was used, LF3C and LF9C would still have the greatest number exposed, but LF1E and PI27E/LF1E would have more people exposed than the Milton siting options.

# TABLE 9.10
## SCALING OF IMPACTS
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ACCESS ROUTE VICINITY)

| | NO. OF RESIDENTS WITHIN NOISE IMPACT ZONE | NO. OF RESIDENTS WITHIN ACCESS ROUTE VICINITY |
|---|---|---|
| PI13N/LF4N | 0.32 | 0.19 |
| PI1N/LF4N | 0.31 | 0.16 |
| PI27E/LF1E | 0.01* | 0.03 |
| LF1E | 0.01* | 0.03 |
| LF3C | 1.0 | 1.0 |
| LF9C | 0.84 | 0.96 |

*Same proportion due to rounding

# TABLE 9.10
# OVERALL IMPACT
## FACTOR GROUPING: IMPACTS ON RESIDENTS
## FACTOR: DISRUPTION OF DAY-TO-DAY ACTIVITIES AND/OR THE USE AND ENJOYMENT OF PROPERTY (ACCESS ROUTE VICINITY)

| INDICATOR/WEIGHTING | NO. OF RESIDENTS WITHIN NOISE IMPACT ZONE 350 | NO. OF RESIDENTS WITHIN ACCESS ROUTE VICINITY 250 | OVERALL IMPACT |
|---|---|---|---|
| PI13N/LF4N | 0.112 | 0.048 | 0.160 |
| PI1N/LF4N[1] | 0.109 | 0.040 | 0.149 |
| PI27E/LF1E | 0.004 | 0.008 | 0.012 |
| LF1E | 0.004 | 0.008 | 0.012 |
| LF3C | 0.350 | 0.250 | 0.600 |
| LF9C | 0.294 | 0.240 | 0.534 |

1. Using the most conservative figures of residents exposed to noise impacts, PI1N/LF4N becomes the least impacted with PI27E/LF1E and LF1E becoming the second least impacted site.

The residential impact index for these siting options were reviewed as a sensitivity test for the indicator, number of residents in the access route vicinity. The residential impact index calculations are provided in Appendix E. The impact index suggests similar relative differences in impact except that the index provides for a distinction between siting options LF1E and PI27E/LF1E. LF1E has a higher impact index (82.6) than PI27E/LF1E (67.4) when this index is considered, PI27E/LF1E becomes the least impacted siting option, with LF1E being potentially impacted to a slightly greater degree.

The number of residents affected by increased noise along the access routes may be overstated. The number of residents shown in Table 9.10 represents the estimated number of residents affected by sound levels of 55dBA or greater in the year 2000, with OWMC truck traffic. A number of these residents may in fact be affected by traffic-related sound levels of 55dBA and over in the future, even if the OWMC trucks are not added. In order to account for this possible overstated situation, the number of residents affected by sound levels of 55dBA or greater in the year 2000, only if OWMC truck traffic is added to the predicted future traffic volume was estimated.

This number is estimated by determining the difference in the number of residents located within the 55dBA noise contour for the year 2000, with the OWMC traffic and the number of residents within the 55dBA noise contour for the year 2000 without the OWMC traffic. The estimates are noted below.

| Siting Option | Estimated Number of Residents |
|---|---|
| PI13N/LF4N | 22 |
| PI1N/LF4N | 17 |
| PI27E/LF1E | 31 |
| LF1E | 31 |
| LF3C | 108 |
| LF9C | 95 |

As the numbers illustrate, LF3C and LF9C remain the siting options with the highest and second highest number of residents potentially affected by noise along the access routes. However, the impact on residents along the access routes for PI27E/LF1E and LF1E becomes greater than that for PI13N/LF4N and PI1N/LF4N.

The number of residents noted above could be an underestimate. The residents who could experience sound levels of 55dBA or greater in the future, even without OWMC truck traffic could still experience an increase in sound levels when OWMC's truck traffic is added. Increases of 1-3dBA are not audible and are of no cause for concern. Increases of 3-5dBA or over would be a concern. Calculations of the actual increase in sound levels experienced by residents along access routes were not made by the noise consultant. Consequently, in our analysis, the number of residents who would potentially experience sound levels of 55dBA or greater, with OWMC's truck traffic has been applied in the analysis.

The actual number of residents affected by increased sound levels above the Ministry of the Environment guidelines is likely somewhere between the numbers indicated in Table 9.10 and those noted above.

## Factor Grouping: Impacts on community and recreation features

### Factor: Displacement

Table 9.11 provides the data and calculations by siting option regarding the community and recreation features on-site that could be displaced.

### TABLE 9.11
### DATA MATRIX
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
### FACTOR: DISPLACEMENT (SITE)

| | NO. OF FEATURES DISPLACED[1] | NO. OF SIGNIFICANT FEATURES DISPLACED[2] |
|---|---|---|
| Potentially Most Impacted | PI13N/LF4N<br>PI1N/LF4N<br>2 | PI1N/LF4N<br>2<br>PI13N/LF4N<br>1 |
| Potentially Least Impacted | PI27E/LF1E; LF1E<br>LF3C; LF9C<br>0 | PI27E/LF1E; LF1E; LF3C;<br>LF9C<br>0 |

1. Features displaced are: PI13N/LF4N - proposed Glenorchy Conservation Area, one historic building; PI1N/LF4N - two historic buildings, one of which, the Tomasky House is designated under The Ontario Heritage Act. See Appendix E for feature characteristics.
2. Includes only those possessing significant heritage value, as assessed by Historica Research Ltd.

### TABLE 9.11
### SCALING OF IMPACTS
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
### FACTOR: DISPLACEMENT (SITE)

| | NO. OF FEATURES DISPLACED | NO. OF SIGNIFICANT FEATURES DISPLACED |
|---|---|---|
| PI13N/LF4N | 1.0 | 0.50 |
| PI1N/LF4N | 1.0 | 1.0 |
| PI27E/LF1E | - | - |
| LF1E | - | - |
| LF3C | - | - |
| LF9C | - | - |

### TABLE 9.11
### OVERALL IMPACT
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
### FACTOR: DISPLACEMENT (SITE)

| | NO. OF FEATURES DISPLACED | NO. OF SIGNIFICANT FEATURES DISPLACED | |
|---|---|---|---|
| INDICATOR/WEIGHTING | 125 | 75 | OVERALL IMPACT |
| PI13N/LF4N | 0.125 | 0.038 | 0.163 |
| PI1N/LF4N | 0.125 | 0.075 | 0.200 |
| PI27E/LF1E | - | - | - |
| LF1E | - | - | - |
| LF3C | - | - | - |
| LF9C | - | - | - |

Siting options LF3C, LF9C, LF1E and PI27E/LF1E have no features located on-site. In addition to the proposed Glenorchy Conservation Area, one feature was identified on PI13N/LF4N. The Glenorchy Conservation Area was first proposed in 1958 and the plans have been recently reactivated. Two historic buildings are located on PI1N/LF4N, one of which is known as the Tomasky House and is designated under The Ontario Heritage Act. It has been determined that some form of acceptable mitigation is possible for these features to minimize the potential impact. OWMC has also expressed its willingness to take appropriate mitigative measures. Consequently, impact through displacement of community and recreation features has been screened from the comparative analysis.

### Factor: Disruption of operations

Study Area: Adjacent to site

The indicators contributing to this factor are the number of community and recreation features adjacent to the site and the number of sensitive features adjacent to the site. Features are classified as sensitive if their clientele consists largely of children or elderly persons and they are in use year-round or intensively for short periods of time such as the summer months, and were judged to be incompatible with the OWMC facility. No sensitive features were identified adjacent to any of the siting options. Table 9.12 provides the data for and calculations of this factor.

The greatest potential for impacts on community and recreation features adjacent to the site was measured for siting options PI27E/LF1E and PI13N/LF4N, each of which has two features located adjacent to these siting options.

TABLE 9.12

DATA MATRIX[1]
FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
FACTOR: DISRUPTION OF OPERATIONS
(ADJACENT TO SITE)

| | NO. OF SENSITIVE FEATURES ADJACENT TO SITE[2, 3] | NO. OF FEATURES ADJACENT TO SITE[3] |
|---|---|---|
| Potentially Most Impacted | | PI13N/LF4N<br>PI27E/LF1E<br>2 |
| | | PI1N/LF4N<br>1 |
| Potentially Least Impacted | LF1E; LF3C; LF9C;<br>PI13N/LF4N; PI1N/LF4N<br>PI27E/LF1E<br>0 | LF1E; LF3C; LF9C<br>0 |

1. Does not include heritage features; includes proposed features currently under development or judged likely to occur.
2. Judgement regarding sensitivity was made using information on type of use, and/or assumed sensitivity of users.
3. The features are:
   PI13N/LF4N – S.O.M. Club, proposed Glenorchy Conservation Area
   PI27E/LF1E – Arpad Hungarian Cultural Centre; Grassybrook Park
   PI1N/LF4N – Hunterbrook Farm.
   See Appendix E for feature characteristics.

### TABLE 9.12
### SCALING OF IMPACTS
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
### FACTOR: DISRUPTION OF OPERATIONS (ADJACENT TO SITE)

| | NO. OF SENSITIVE FEATURES ADJACENT TO SITE | NO. OF FEATURES ADJACENT TO SITE |
|---|---|---|
| PI13N/LF4N | - | 1.0 |
| PI1N/LF4N | - | 0.50 |
| PI27E/LF1E | - | 1.0 |
| LF1E | - | - |
| LF3C | - | - |
| LF9C | - | - |

### TABLE 9.12
### OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
FACTOR: DISRUPTION OF OPERATIONS
(ADJACENT TO SITE)
FACTOR WEIGHTING: 300

| | NO. OF SENSITIVE FEATURES ADJACENT TO SITE | NO. OF FEATURES ADJACENT TO SITE | OVERALL IMPACT |
|---|---|---|---|
| INDICATOR/WEIGHTING | 175 | 125 | |
| PI13N/LF4N | - | 0.125 | 0.125 |
| PI1N/LF4N | - | 0.063 | 0.063 |
| PI27E/LF1E | - | 0.125 | 0.125 |
| LF1E | - | - | - |
| LF3C | - | - | - |
| LF9C | - | - | - |

The S.O.M. Club (private retreat property) and the proposed Glenorchy Conservation Area are adjacent to PI13N/LF4N. The Arpad Hungarian Cultural Centre (a private club used occasionally for social events) and Grassybrook Park are adjacent to PI27E/LF1E.

PI1N/LF4N has one feature, Hunterbrook Farms (a riding stable), located adjacent to the siting options. No features were identified adjacent to LF3C, LF9C and LF1E.

Factor: Disruption of operations

Study Area: Site vicinity

Disruption of operations of community and recreation features in the site vicinity was measured by the number of features and sensitive features within both the site vicinity and the noise impact zone. Features were considered to be sensitive if noise was judged to potentially affect operations, and if they were intensively used and primarily served children or the elderly. The data and calculations for this factor are provided in Table 9.13.

The greatest potential impact on community and recreation features through disruption of operations was identified for LF3C. This siting option has two community and recreation features in the noise impact zone and both are considered sensitive to noise. LF3C, however, has the second lowest number of features and sensitive features in the site vicinity.

PI27E/LF1E is the second most impacted siting option with respect to disruption of community and recreation features in the site vicinity. It has one feature in the noise impact zone and that feature is judged to be noise

## TABLE 9.13

### DATA MATRIX[1]
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
### FACTOR: DISRUPTION OF OPERATIONS
### (SITE VICINITY)

| | NO. OF SENSITIVE FEATURES WITHIN NOISE IMPACT ZONE[2, 4] | NO. OF FEATURES WITHIN NOISE IMPACT ZONE[4] | NO. OF SENSITIVE FEATURES WITHIN SITE VICINITY[3, 4] | NO. OF FEATURES WITHIN SITE VICINITY[4] |
|---|---|---|---|---|
| Potentially Most Impacted | LF3C<br>2 | LF3C<br>2 | PI13N/LF4N<br>7 | PI27E/LF1E;<br>20 |
| | PI27E/LF1E<br>1 | PI27E/LF1E<br>PI13N/LF4N<br>PI1N/LF4N<br>1 | LF1E; PI27E/LF1E<br>PI1N/LF4N<br>6 | PI1N/LF4N<br>PI13N/LF4N<br>16 |
| | | | LF3C<br>4 | LF1E<br>14 |
| | | | | LF3C<br>6 |
| Potentially Least Impacted | PI13N/LF4N<br>LF9C; LF1E<br>PI1N/LF4N<br>0 | LF9C; LF1E<br>0 | LF9C<br>1 | LF9C<br>2 |

1. Does not include heritage features; includes proposed features currently under development or judged likely to occur.
2. Includes those features with uses judged to conflict with noise.
3. Judgement regarding sensitivity was made using information on type of use and/or assumed sensitivity of users.
4. Refer to Appendix E for the names and characteristics of features in the site vicinity.

# TABLE 9.13
## SCALING OF IMPACTS
## FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
## FACTOR: DISRUPTION OF OPERATIONS
## (SITE VICINITY)

| | NO. OF SENSITIVE FEATURES WITHIN NOISE IMPACT ZONE | NO. OF FEATURES WITHIN NOISE IMPACT ZONE | NO. OF SENSITIVE FEATURES WITHIN SITE VICINITY | NO. OF FEATURES WITHIN SITE VICINITY |
|---|---|---|---|---|
| PI13N/LF4N | - | 0.50 | 1.0 | 0.80 |
| PI1N/LF4N | - | 0.50 | 0.86 | 0.80 |
| PI27E/LF1E | 0.50 | 0.50 | 0.86 | 1.0 |
| LF1E | - | - | 0.86 | 0.70 |
| LF3C | 1.0 | 1.0 | 0.57 | 0.30 |
| LF9C | - | - | 0.14 | 0.10 |

# TABLE 9.13
## OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
FACTOR: DISRUPTION OF OPERATIONS
(SITE VICINITY)
FACTOR WEIGHTING: 200

| | NO. OF SENSITIVE FEATURES WITHIN NOISE IMPACT ZONE | NO. OF FEATURES WITHIN NOISE IMPACT ZONE | NO. OF SENSITIVE FEATURES WITHIN SITE VICINITY | NO. OF FEATURES WITHIN SITE VICINITY | OVERALL |
|---|---|---|---|---|---|
| INDICATOR/WEIGHTING | 75 | 55 | 40 | 30 | IMPACT |
| PI13N/LF4N | - | 0.028 | 0.040 | 0.024 | 0.092 |
| PI1N/LF4N | - | 0.028 | 0.034 | 0.024 | 0.086 |
| PI27E/LF1E | 0.038 | 0.028 | 0.034 | 0.030 | 0.130 |
| LF1E | - | - | 0.034 | 0.021 | 0.055 |
| LF3C | 0.075 | 0.055 | 0.023 | 0.009 | 0.162 |
| LF9C | - | - | 0.006 | 0.003 | 0.009 |

sensitive. The vicinity of PI27E/LF1E has the highest number of features and second highest number of sensitive features (along with LF1E and PI1N/LF4N).

The third potentially most impacted siting option is PI13N/LF4N. This option has one feature within the noise impact zone. This option has the second highest number of community and recreation features in the site vicinity (along with PI1N/LF4N) and the highest number of sensitive features in the site vicinity.

PI1N/LF4N is the fourth most impacted siting option. The number of features and sensitive features within the site vicinity rank second of all siting options and this option has one feature in the noise impact zone.

The second least impacted siting option is LF1E. There are no features within the noise impact zone. LF1E has the third highest number of features located in the site vicinity and the second highest number of sensitive features in the site vicinity (same as PI27E/LF1E and PI1N/LF4N).

The least impacted of all siting options is LF9C. This site has the fewest features and sensitive features in the site vicinity and has no features within the site's noise impact zone.

Factor: Disruption of operations

Study Area: Adjacent to the access route

The potential disruption of operations of community and recreation features is measured by the number of features and sensitive features adjacent to the access route. Features were considered sensitive if they were used intensively on a regular basis and primarily served children or the elderly. Table 9.14 provides the data and calculations for this factor.

The greatest potential impact on community and recreation features adjacent to the access route was identified for LF3C. This option has the highest number of features and sensitive features located adjacent to the access route.

PI13N/LF4N and PI1N/LF4N are equal as the second most impacted siting options. They have the second highest number of features adjacent to the access routes and the second highest number of sensitive features.

LF9C has the second lowest number of community and recreation features and sensitive features adjacent to the access route.

The potentially least impacted of the siting options are PI27E/LF1E and LF1E. These siting options have only one community and recreation feature located adjacent to the access route; and it is not considered as a sensitive feature.

The impact index, calculated as a sensitivity check, permits some refinement of the distinction between sites.

LF3C and PI13N/LF4N have the highest impact index (15.5) and PI1N/LF4N the second highest impact index (14.4) for community and recreation features adjacent to the access route. LF9C has the third highest impact index (12.1). PI27E/LF1E and LF1E have the lowest impact index (1.1).

## TABLE 9.14
## DETAILED COMPARATIVE EVALUATION: DATA MATRIX[1]
## FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
## FACTOR: DISRUPTION OF OPERATIONS
## (ADJACENT TO ACCESS ROUTE)

| | NO. OF SENSITIVE FEATURES ADJACENT TO ACCESS ROUTE[2, 3] | NO. OF FEATURES ADJACENT TO ACCESS ROUTE[3] |
|---|---|---|
| Potentially Most Impacted | LF3C<br>9 | LF3C<br>18 |
| | PI13N/LF4N<br>PI1N/LF4N<br>7 | PI13N/LF4N<br>PI1N/LF4N<br>16 |
| | LF9C<br>6 | LF9C<br>14 |
| Potentially Least Impacted | LF1E; PI27E/LF1E<br>0 | LF1E; PI27E/LF1E<br>1 |

1. Does not include heritage features; includes proposed features currently under development or judged likely to occur.
2. Judgement regarding sensitivity was made using information on type of use and/or assumed sensitivity of users.
3. Refer to Appendix E for the names and characteristics of the features adjacent to the access route.

TABLE 9.14
SCALING OF IMPACTS
FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
FACTOR: DISRUPTION OF OPERATIONS
(ADJACENT TO ACCESS ROUTE)

| | NO. OF SENSITIVE FEATURES ADJACENT TO ACCESS ROUTE | NO. OF FEATURES ADJACENT TO ACCESS ROUTE |
|---|---|---|
| PI13N/LF4N | 0.78 | 0.89 |
| PI1N/LF4N | 0.78 | 0.89 |
| PI27E/LF1E | - | 0.06 |
| LF1E | - | 0.06 |
| LF3C | 1.0 | 1.0 |
| LF9C | 0.67 | 0.78 |

TABLE 9.14
OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
FACTOR: DISRUPTION OF OPERATIONS
(ADJACENT TO ACCESS ROUTE)
FACTOR WEIGHTING: 150

| | NO. OF SENSITIVE FEATURES ADJACENT TO ACCESS ROUTE | NO. OF FEATURES ADJACENT TO ACCESS ROUTE | OVERALL IMPACT |
|---|---|---|---|
| INDICATOR WEIGHTING | 100 | 50 | |
| PI13N/LF4N | 0.078 | 0.045 | 0.123 |
| PI1N/LF4N | 0.078 | 0.045 | 0.123 |
| PI27E/LF1E | - | 0.003 | 0.003 |
| LF1E | - | 0.003 | 0.003 |
| LF3C | 0.100 | 0.050 | 0.150 |
| LF9C | 0.067 | 0.039 | 0.106 |

While the index for the projected impact for features along the access route shows PI13N/LF4N to be slightly more impacted than PI1N/LF4N, the distinctions are not sufficient to alter the ranking of sites for this factor.

The impact index calculations are in Appendix E.

Factor: Disruption of operations

Study Area: Access route vicinity

The potential disruption of operations of community and recreation features was measured by the total number of features and the number of sensitive features in the access route vicinity and within the noise impact zone. A feature was considered sensitive if noise was judged to potentially disrupt its operation, or the feature was used intensively and primarily served children or the elderly. Table 9.15 gives the data and calculations for this factor.

Potential for disruption of operations of community and recreation features is greatest for PI13N/LF4N because it has the largest number of features and the largest number of sensitive features (along with LF3C) within the access route vicinity. The number of sensitive features and total features within the noise impact zone rank first and second respectively, relative to the other siting options.

LF3C has the second highest number of features and highest number of sensitive features in the access route vicinity. The route to LF3C has the highest number of features and second highest number of sensitive features in the noise impact zone. Overall, LF3C is judged to be the second most impacted siting option (along with PI1N/LF4N).

## TABLE 9.15
## DATA MATRIX[1]
## FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
## FACTOR: DISRUPTION OF OPERATIONS
## (ACCESS ROUTE VICINITY)

| | NO. OF SENSITIVE FEATURES WITHIN NOISE IMPACT ZONE[2,4] | NO. OF FEATURES WITHIN NOISE IMPACT ZONE[4] | NO. OF SENSITIVE FEATURES WITHIN ACCESS ROUTE VICINITY[3,4] | NO. OF FEATURES WITHIN ACCESS ROUTE VICINITY[4] |
|---|---|---|---|---|
| Potentially Most Impacted | PI13N/LF4N<br>PI1N/LF4N<br>14 | LF3C<br>21 | LF3C<br>PI13N/LF4N<br>7 | PI13N/LF4N<br>15 |
| | LF3C<br>11 | PI1N/LF4N<br>PI13N/LF4N<br>20 | LF9C<br>6 | LF3C<br>13 |
| | LF9C<br>7 | LF9C<br>17 | PI1N/LF4N<br>5 | PI1N/LF4N<br>12 |
| | | | | LF9C<br>11 |
| Potentially Least Impacted | LF1E<br>PI27E/LF1E<br>1 | LF1E<br>PI27E/LF1E<br>1 | PI27E/LF1E<br>LF1E<br>0 | LF1E<br>PI27E/LF1E<br>2 |

1. Does not include heritage features; includes proposed features currently under development or judged likely to occur.
2. Includes those features with uses judged to conflict with noise.
3. Judgement regarding sensitivity was made using information on type of use and/or assumed sensitivity of users.
4. Refer to Appendix E for the names and characteristics of features in the access route vicinity.

## TABLE 9.15
## SCALING OF IMPACTS
## FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
## FACTOR: DISRUPTION OF OPERATIONS
## (ACCESS ROUTE VICINITY)

| | NO. OF SENSITIVE FEATURES WITHIN NOISE IMPACT ZONE | NO. OF FEATURES WITHIN NOISE IMPACT ZONE | NO. OF SENSITIVE FEATURES WITHIN ACCESS ROAD VICINITY | NO. OF FEATURES WITHIN ACCESS ROAD VICINITY |
|---|---|---|---|---|
| PI13N/LF4N | 1.0 | 0.95 | 1.0 | 1.0 |
| PI1N/LF4N | 1.0 | 0.95 | 0.71 | 0.80 |
| PI27E/LF1E | 0.07 | 0.05 | - | 0.13 |
| LF1E | 0.07 | 0.05 | - | 0.13 |
| LF3C | 0.79 | 1.0 | 1.0 | 0.87 |
| LF9C | 0.50 | 0.81 | 0.86 | 0.73 |

### TABLE 9.15
### OVERALL IMPACT
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND RECREATION FEATURES
### FACTOR: DISRUPTION OF OPERATIONS
### .(ACCESS ROUTE VICINITY)
### FACTOR WEIGHTING: 100

| | NO. OF SENSITIVE FEATURES WITHIN NOISE IMPACT ZONE | NO. OF FEATURES WITHIN NOISE IMPACT ZONE | NO. OF SENSITIVE FEATURES WITHIN ACCESS ROUTE VICINITY | NO. OF FEATURES WITHIN ACCESS ROUTE VICINITY | OVERALL IMPACT |
|---|---|---|---|---|---|
| INDICATOR WEIGHTING | 40 | 25 | 20 | 15 | |
| PI13N/LF4N | 0.040 | 0.024 | 0.020 | 0.015 | 0.099 |
| PI1N/LF4N | 0.040 | 0.024 | 0.014 | 0.012 | 0.090 |
| PI27E/LF1E | 0.003 | 0.001 | - | 0.002 | 0.006 |
| LF1E | 0.003 | 0.001 | - | 0.002 | 0.006 |
| LF3C | 0.032 | 0.025 | 0.020 | 0.013 | 0.090 |
| LF9C | 0.020 | 0.020 | 0.017 | 0.011 | 0.068 |

PI1N/LF4N is tied with LF3C as the second most potentially impacted siting option. It has the third highest number of features and sensitive features located in the access route vicinity. It also has the second highest number of features and highest number of sensitive features (same as PI13N/LF4N) within the noise impact zone.

The second potentially least impacted of the siting options is LF9C. LF9C has the second lowest number of features but the second highest number of sensitive features in the access route vicinity. LF9C has the third highest number of features and sensitive features in the noise impact zone.

PI27E/LF1E and LF1E are tied as the potentially least impacted of all siting options. The access routes to these siting options have the fewest features in the vicinity and none are considered sensitive. There is only one feature, which is judged to be noise sensitive, within the noise impact zone for both of these options.

The impact index used as a sensitive test for the indicator, number of community and recreation features in the access route vicinity shows LF3C and LF9C have the highest impact index (13.1), followed by PI13N/LF4N (impact index 11.3), and PI1N/LF4N (impact index 10.1). The lowest impact index (1.0) was calculated for PI27E/LF1E and LF1E (see Appendix E). While the ranking based on the impact index for the indicator differs from that determined by our basic analysis, the differences are minor, and given the very low weight assigned to this indicator (15 points), no change in the site option ranking for this factor is warranted.

## Factor Grouping: Impacts on community and region

### Factor: Social stability

To assess the potential impact on social stability, the existing level of stability and rate of population change, as a measure of the propensity for change, were utilized. The potential for disruption of stability through displacement of residents on-site and voluntary out-migration of area residents was considered. Table 9.16 provides the data and calculations for this factor.

PI27E/LF1E is the potentially most impacted of all siting options in terms of social stability. This siting option has the highest level of existing social stability (along with LF9C), relative to the other siting options. The stability of PI27E/LF1E is the most disrupted through resident displacement and the third most disrupted through the voluntary out-migration of residents.

The social stability of LF1E is slightly less impacted than PI27E/LF1E. LF1E is the third most stable siting option as demonstrated by the stability index. Potential disruption through resident displacement is the second highest. However, LF1E is potentially second least disrupted by residents voluntarily leaving the area.

LF3C is potentially the third most impacted siting option. The social stability of LF3C would be the second least disrupted through the displacement of residents and potentially most impacted through voluntary out-migration of residents.

TABLE 9.16
DATA MATRIX
FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
FACTOR: SOCIAL STABILITY

| | | | DISRUPTION THROUGH RESIDENT DISPLACEMENT[3] | | | | DISRUPTION THROUGH OUT-MIGRATION[4] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | STABILITY[1] INDEX | MUNICIPAL[2] GROWTH 1971-1981 | % of Displaced Households at Current Address > 5 years | % of Displaced Households Who Are Homeowners | % of Displaced Households Whose Ancestors Owned Property | % of Displaced Households Whose Ancestors Lived in Municipality | % of Moving Households at Current Address > 5 Years | % of Moving Households Who Are Homeowners | % of Moving Households Whose Ancestors Owned Property | % of Moving Households Whose Ancestors Lived in Municipality |
| Potentially Most Impacted | PI27E/LF1E<br>255 | LF1E<br>PI27E/LF1E<br>6% | LF9C<br>100 | LF9C<br>100 | PI13N/LF4N<br>38 | PI27E/LF1E<br>67 | PI27E/LF1E<br>92 | PI27E/LF1E<br>PI1N/LF4N<br>PI13N/LF4N<br>LF3C; LF9C<br>LF1E<br>100 | PI13N/LF4N<br>35 | LF3C<br>44 |
| | LF9C<br>254 | LF3C; LF9C<br>17% | LF1E<br>79 | LF1E<br>93 | PI1N/LF4N<br>PI27E/LF1E<br>33 | LF1E<br>50 | LF1E<br>89 | | PI1N/LF4N<br>LF3C<br>31 | PI27E/LF1E<br>42 |
| | LF1E<br>251 | | PI27E/LF1E<br>69 | PI27E/LF1E<br>92 | LF1E<br>31 | LF3C<br>33 | LF3C<br>88 | | LF9C<br>25 | PI13N/LF4N<br>35 |
| | LF3C<br>238 | | PI1N/LF4N<br>LF3C<br>67 | PI1N/LF4N<br>89 | LF3C<br>17 | PI13N/LF4N<br>25 | LF9C<br>75 | | LF1E<br>11 | LF1E<br>33 |
| | PI1N/LF4N<br>221 | | | LF3C<br>67 | | PI1N/LF4N<br>22 | PI13N/LF4N<br>53 | | | PI1N/LF4N<br>31 |
| Potentially Least Impacted | PI13N/LF4N<br>214 | PI13N/LF4N<br>PI1N/LF4N<br>100% | PI13N/LF4N<br>63 | PI13N/LF4N<br>62 | LF9C<br>0 | LF9C<br>0 | PI1N/LF4N<br>31 | | PI27E/LF1E<br>8 | LF9C<br>25 |

1. Stability Index = % of households at current address >5 years + % homeowners + % of households whose ancestors owned property + % of households whose ancestors lived in municipality.
2. From 1981 Census.
3. All data taken from survey of on-site residents.
4. All data taken from survey of adjacent and vicinity residents.

TABLE 9.16
SCALING OF IMPACTS
FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
FACTOR: SOCIAL STABILITY

| | STABILITY INDEX | MUNICIPAL GROWTH 1971-1981 | DISRUPTION THROUGH RESIDENT DISPLACEMENT | | | | DISRUPTION THROUGH OUT-MIGRATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | % of Displaced Households at Current Address > 5 years | % of Displaced Households Who Are Homeowners | % of Displaced Households Whose Ancestors Owned Property | % of Displaced Households Whose Ancestors Lived in Municipality | % of Moving Households at Current Address > 5 Years | % of Moving Households Who Are Homeowners | % of Moving Households Whose Ancestors Owned Property | % of Moving Households Whose Ancestors Lived in Municipality |
| PI13N/LF4N | 0.84 | - | 0.63 | 0.62 | 1.0 | 0.37 | 0.58 | 1.0 | 1.0 | 0.80 |
| PI1N/LF4N | 0.87 | - | 0.67 | 0.89 | 0.87 | 0.33 | 0.34 | 1.0 | 0.89 | 0.70 |
| PI27E/LF1E | 1.0 | 0.94 | 0.69 | 0.92 | 0.87 | 1.0 | 1.0 | 1.0 | 0.23 | 0.95 |
| LF1E | 0.98 | 0.94 | 0.79 | 0.93 | 0.82 | 0.75 | 0.97 | 1.0 | 0.31 | 0.75 |
| LF3C | 0.93 | 0.83 | 0.67 | 0.67 | 0.45 | 0.49 | 0.96 | 1.0 | 0.89 | 1.0 |
| LF9C | 1.0 | 0.83 | 1.0 | 1.0 | - | - | 0.82 | 1.0 | 0.71 | 0.57 |

### TABLE 9.16
### OVERALL IMPACT
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
### FACTOR: SOCIAL STABILITY
### FACTOR WEIGHTING: 800

|  | STABILITY INDEX | MUNICIPAL GROWTH 1971-1981 | DISRUPTION THROUGH RESIDENT DISPLACEMENT |  |  |  | DISRUPTION THROUGH OUT-MIGRATION |  |  |  | OVERALL IMPACT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INDICATOR WEIGHTING | 195 | 165 | 240 |  |  |  | 200 |  |  |  |  |
|  |  |  | % of Displaced Households at Current Address > 5 years | % of Displaced Households Who Are Homeowners | % of Displaced Households Whose Ancestors Owned Property | % of Displaced Households Whose Ancestors Lived In Municipality | % of Moving Households at Current Address > 5 Years | % of Moving Households Who Are Homeowners | % of Moving Households Whose Ancestors Owned Property | % of Moving Households Whose Ancestors Lived In Municipality |  |
| Sub-Indicator Weighting | - | - | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 |  |
| PI13N/LF4N | 0.164 | - | 0.038 | 0.037 | 0.060 | 0.022 | 0.029 | 0.050 | 0.050 | 0.040 | 0.490 |
| PI1N/LF4N | 0.170 | - | 0.040 | 0.053 | 0.052 | 0.020 | 0.017 | 0.050 | 0.045 | 0.035 | 0.482 |
| PI27E/LF1E | 0.195 | 0.155 | 0.041 | 0.055 | 0.052 | 0.060 | 0.050 | 0.050 | 0.012 | 0.048 | 0.718 |
| LF1E | 0.191 | 0.155 | 0.047 | 0.056 | 0.049 | 0.045 | 0.049 | 0.050 | 0.016 | 0.038 | 0.696 |
| LF3C | 0.181 | 0.137 | 0.040 | 0.040 | 0.027 | 0.029 | 0.048 | 0.050 | 0.045 | 0.050 | 0.647 |
| LF9C | 0.195 | 0.137 | 0.060 | 0.060 | - | - | 0.041 | 0.050 | 0.036 | 0.029 | 0.608 |

The most stable of all siting options, in terms of existing social stability, LF9C (along with PI27E/LF1E), is the fourth most potentially impacted in terms of social stability. Despite the high level of existing stability, the overall potential for disruption through voluntary out-migration and resident displacement is considered moderate relative to the other siting options.

The social stability of PI13N/LF4N is potentially the second least impacted. The existing level of social stability at this siting option is the lowest. A moderate level of potential disruption through resident displacement was calculated for PI13N/LF4N. This siting option is the second most potentially disrupted through voluntary out-migration.

The potentially least impacted siting option is PI1N/LF4N. This option has the second lowest level of existing stability. While the potential for disruption through resident displacement is moderately high, PI1N/LF4N has the least potential for disruption through resident out-migration.

### Factor: Social cohesion

The potential impact on social cohesion was determined based upon the disruption through resident displacement and resident out-migration. The data and calculations for this factor are provided in Table 9.17.

LF3C is potentially the most impacted of all siting options in terms of social cohesion. The highest potential disruption through resident out-migration was measured for LF3C. Disruption to social cohesion through resident displacement was measured at a moderate level for LF3C relative to the other siting options. One feature that contributes to social cohesion (Elcho United Church) was identified.

TABLE 9.17
DATA MATRIX
FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
FACTOR: SOCIAL COHESION

| | DISRUPTION THROUGH RESIDENT DISPLACEMENT[1] | | | | | DISRUPTION THROUGH OUT-MIGRATION[1] | | | | NUMBER OF COMMUNITY FEATURES CONTRIBUTING TO COHESION DISRUPTED[2] |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Friends and Relatives of Those Displaced | Number of Displaced Households With Community Group Leaders | Number of Displaced Households With Community Group Members | Number of Displaced Households With Children | Number of Children in Displaced Households | Number of Moving Households With Community Group Leaders | Number of Moving Households With Community Group Members | Number of Moving Households With Children | Number of Children in Moving Households | |
| Potentially Most Impacted | PI27E/LF1E<br>70<br>LF1E<br>67<br>PI13N/LF4N<br>21<br>LF3C<br>15<br>PI1N/LF4N<br>12 | PI13N/LF4N<br>4<br>LF3C<br>3<br>LF1E<br>2<br>PI27E/LF1E<br>PI1N/LF4N<br>1 | LF1E<br>PI13N/LF4N<br>6<br>PI1N/LF4N<br>LF3C<br>5<br>PI27E/LF1E<br>4 | PI13N/LF4N<br>5<br>PI27E/LF1E<br>4<br>LF1E<br>LF3C<br>PI1N/LF4N<br>3 | PI27E/LF1E<br>11<br>LF1E<br>10<br>LF3C<br>9<br>PI13N/LF4N<br>7<br>PI1N/LF4N<br>4 | LF3C<br>7<br>PI27E/LF1E<br>PI13N/LF4N<br>LF9C<br>3<br>LF1E<br>2 | LF3C<br>10<br>PI27E/LF1E<br>9<br>PI13N/LF4N<br>LF1E<br>8<br>LF9C<br>7 | LF3C<br>11<br>PI1N/LF4N<br>8<br>PI27E/LF1E<br>PI13N/LF4N<br>7<br>LF1E<br>6<br>LF9C<br>4 | LF3C<br>30<br>PI27E/LF1E<br>14<br>LF1E<br>13<br>PI1N/LF4N<br>12<br>PI13N/LF4N<br>9 | LF3C<br>LF1E<br>PI27E/LF1E<br>1 |
| Potentially Least Impacted | LF9C<br>4 | LF9C<br>0 | LF9C<br>1 | LF9C<br>0 | LF9C<br>0 | PI1N/LF4N<br>1 | PI1N/LF4N<br>5 | | LF9C<br>8 | LF9C<br>PI1N/LF4N<br>PI13N/LF4N<br>0 |

1. All data taken from survey of residents on-site, adjacent to site, and in site vicinity
2. Includes features which are primarily locally-serving, largely used by the same groups/individuals on a regular basis.

### TABLE 9.17
### SCALING OF IMPACTS
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
### FACTOR: SOCIAL COHESION
### FACTOR WEIGHTING: 400

| | DISRUPTION THROUGH RESIDENT DISPLACEMENT | | | | | DISRUPTION THROUGH OUT-MIGRATION | | | | NUMBER OF COMMUNITY FEATURES CONTRIBUTING TO COHESION DISRUPTED |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Friends and Relatives of Those Displaced | Number of Displaced Households With Community Group Leaders | Number of Displaced Households With Community Group Members | Number of Displaced Households With Children | Number of Children in Displaced Households | Number of Moving Households With Community Group Leaders | Number of Moving Households With Community Group Members | Number of Moving Households With Children | Number of Children in Moving Households | |
| PI13N/LF4N | 0.30 | 1.0 | 1.0 | 1.0 | 0.64 | 0.43 | 0.80 | 0.64 | 0.30 | - |
| PI1N/LF4N | 0.17 | 0.25 | 0.83 | 0.60 | 0.36 | 0.14 | 0.50 | 0.73 | 0.40 | - |
| PI27E/LF1E | 1.0 | 0.25 | 0.67 | 0.80 | 1.0 | 0.43 | 0.90 | 0.64 | 0.47 | 1.0 |
| LF1E | 0.96 | 0.50 | 1.0 | 0.60 | 0.91 | 0.29 | 0.80 | 0.55 | 0.43 | 1.0 |
| LF3C | 0.21 | 0.75 | 0.83 | 0.60 | 0.82 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| LF9C | 0.06 | - | 0.17 | - | - | 0.43 | 0.70 | 0.36 | 0.27 | - |

# TABLE 9.17
OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
FACTOR: SOCIAL COHESION
FACTOR WEIGHTING: 400

| INDICATOR WEIGHTING | DISRUPTION THROUGH RESIDENT DISPLACEMENT 200 | | | | | DISRUPTION THROUGH OUT-MIGRATION 120 | | | | NUMBER OF COMMUNITY FEATURES CONTRIBUTING TO COHESION DISRUPTED 80 | OVERALL IMPACT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Friends and Relatives of Those Displaced | Number of Displaced Households With Community Group Leaders | Number of Displaced Households With Community Group Members | Number of Displaced Households With Children | Number of Children in Displaced Households | Number of Moving Households With Community Group Leaders | Number of Moving Households With Community Group Members | Number of Moving Households With Children | Number of Children in Moving Households | | |
| Sub-Indicator Weighting | 40 | 40 | 40 | 40 | 40 | 30 | 30 | 30 | 30 | - | |
| PI13N/LF4N | 0.012 | 0.040 | 0.040 | 0.040 | 0.026 | 0.013 | 0.024 | 0.019 | 0.009 | - | 0.223 |
| PI1N/LF4N | 0.007 | 0.010 | 0.033 | 0.024 | 0.014 | 0.004 | 0.015 | 0.022 | 0.012 | - | 0.141 |
| PI27E/LF1E | 0.040 | 0.010 | 0.027 | 0.032 | 0.040 | 0.013 | 0.027 | 0.019 | 0.014 | 0.080 | 0.302 |
| LF1E | 0.038 | 0.020 | 0.040 | 0.024 | 0.036 | 0.009 | 0.024 | 0.017 | 0.013 | 0.080 | 0.301 |
| LF3C | 0.008 | 0.030 | 0.033 | 0.024 | 0.033 | 0.030 | 0.030 | 0.030 | 0.030 | 0.080 | 0.328 |
| LF9C | 0.002 | - | 0.007 | - | - | 0.013 | 0.021 | 0.011 | 0.008 | - | 0.062 |

The second highest impact on social cohesion was calculated for PI27E/LF1E. The impact on cohesion through resident displacement and resident out-migration is the second highest of all siting options. One feature contributing to social cohesion (Lyons Creek United Church) was identified.

LF1E is potentially third highest impacted of all siting options in terms of social cohesion although it is only slightly less impacted than PI27E/LF1E. The cohesion of this siting option is the second most impacted in terms of resident displacement but second least impacted in terms of resident out-migration. One feature (Lyons Creek United Church) contributing to social cohesion was identified.

The fourth most impacted siting option is PI13N/LF4N. This siting option is the most impacted for the resident displacement and the third most impacted in terms of resident out-migration.

PI1N/LF4N is the second least impacted siting option. Potential for disruption through resident displacement and voluntary out-migration was determined to be the second lowest and lowest respectively, of all siting options.

The potentially least impacted of all siting options with respect to social cohesion is LF9C. Disruption to cohesion through resident displacement and voluntary out-migration was found to be the lowest for LF9C.

It should be noted that a limitation of the social cohesion factor is that it reflects in part the number of people who would be displaced. Because of the very small number of people to be displaced from LF9C, the overall measure for the indicator dealing with disruption from resident displacement is extremely low and as a result this reflects on the overall impact for the social cohesion factor. The ranking based on the numerical weighting should not be viewed as reflecting totally the degree of cohesion amongst the residents in and around the various sites, and in particular LF9C.

Factor: Community character

Three indicators contributed to the numerical analysis of community character: compatibility with land use, visual impact and heritage features. Table 9.18 provides the data and calculations for this factor.

In terms of the community character factor, PI13N/LF4N is potentially the most impacted. The area around the two parcels of land which comprise this siting option can be characterized as primarily rural/agricultural. The farms and horse stables are interspersed with rural residential development. While the area is generally flat, the East Oakville Creek cuts a deep ravine to the south and east of PI13N. The LF4N site is visible from the Niagara Escarpment.

The community character of PI13N/LF4N is potentially most impacted with respect to heritage features and visual compatibility and second most impacted in terms of compatibility with land use.

The character of the area around PI1N/LF4N is predominately rural/agricultural. Rural residential development is intermixed with the crop farms and horse stables. This siting option can be seen from the Niagara Escarpment. PI1N/LF4N is the second most impacted with respect to

### TABLE 9.18
### DATA MATRIX
### FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
### FACTOR: COMMUNITY CHARACTER

| | COMPATIBILITY WITH LAND USE | | | | HERITAGE FEATURES[5] | | | VISUAL COMPATIBILITY[6] | |
|---|---|---|---|---|---|---|---|---|---|
| | % Non-Industrial 2km[1] | % Non-Industrial 2km - 5km[2] | % Designated Non-Industrial 2km[3] | % Designated Non-Industrial 2km - 5km[4] | Average Heritage Value | Density of Structures | Historic Landscape | With Respect to Land Use | Intrusion on Traffic |
| Potentially Most Impacted | All Siting Options<br>100 | PI1N/LF4N<br>PI13N/LF4N<br>LF3C; LF9C<br>100 | LF3C, LF9C<br>PI13N/LF4N<br>PI1N/LF4N<br>100 | LF3C<br>LF9C<br>100 | PI1N/LF4N<br>29.6 | PI13N/LF4N<br>2.2 | LF3C<br>LF9C<br>3.0 | PI13N/LF4N<br>6.0 | PI13N/LF4N<br>6.0 |
| | | PI27E/LF1E<br>96 | LF1E<br>98 | PI13N/LF4N<br>PI1N/LF4N<br>99 | PI13N/LF4N<br>28.8 | PI1N/LF4N<br>2.1 | PI1N/LF4N<br>PI13N/LF4N<br>LF1E<br>2.0 | PI1N/LF4N<br>5.0 | PI1N/LF4N<br>5.0 |
| | | | | PI27E/LF1E<br>90 | LF3C<br>26.7 | LF9C<br>2.0 | | LF9C<br>4.0 | PI27E/LF1E<br>4.0 |
| | | | | | LF1E<br>25.9 | LF1E; LF3C<br>1.9 | | LF3C<br>3.0 | LF1E<br>3.0 |
| | | | | | LF9C<br>25.5 | | | PI27E/LF1E<br>2.0 | LF9C<br>2.0 |
| Potentially Least Impacted | | LF1E<br>94 | PI27E/LF1E<br>77 | LF1E<br>86 | PI27E/LF1E<br>24.5 | PI27E/LF1E<br>1.8 | PI27E/LF1E<br>1.0 | LF1E<br>1.0 | LF3C<br>1.0 |

1. Non-industrial land use as a percentage of existing land use within 2km of the site.
2. Non-industrial land use as a percentage of existing land use 2km - 5km of the site.
3. Non-industrial land use as a percentage of designated land use within 2 km of the site.
4. Non-industrial land use as a percentage of designated land use 2km - 5 km of the site.
5. As provided by Historica Research Ltd.
6. As provided by EDA Collaborative Inc.

## TABLE 9.18
## SCALING OF IMPACTS
## FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
## FACTOR: COMMUNITY CHARACTER

| | COMPATIBILITY WITH LAND USE | | | | HERITAGE FEATURES | | | VISUAL COMPATIBILITY | |
|---|---|---|---|---|---|---|---|---|---|
| | % Non-Industrial 2km | % Non-Industrial 2km - 5km | % Designated Non-Industrial 2km | % Designated Non-Industrial 2km - 5km | Average Heritage Value | Density of Structures | Historic Landscape | With Respect to Land Use | Intrusion on Traffic |
| PI13N/LF4N | 1.0 | 1.0 | 1.0 | 0.99 | 0.97 | 1.0 | 0.67 | 1.0 | 1.0 |
| PI1N/LF4N | 1.0 | 1.0 | 1.0 | 0.99 | 1.0 | 0.95 | 0.67 | 0.83 | 0.83 |
| PI27E/LF1E | 1.0 | 0.96 | 0.77 | 0.90 | 0.83 | 0.82 | 0.33 | 0.33 | 0.67 |
| LF1E | 1.0 | 0.94 | 0.98 | 0.86 | 0.88 | 0.86 | 0.67 | 0.17 | 0.50 |
| LF3C | 1.0 | 1.0 | 1.0 | 1.0 | 0.90 | 0.86 | 1.0 | 0.50 | 0.17 |
| LF9C | 1.0 | 1.0 | 1.0 | 1.0 | 0.86 | 0.91 | 1.0 | 0.67 | 0.33 |

TABLE 9.18
OVERALL IMPACT
FACTOR GROUPING: IMPACTS ON COMMUNITY AND REGION
FACTOR: COMMUNITY CHARACTER
FACTOR WEIGHTING: 800

| | COMPATIBILITY WITH LAND USE | | | | HERITAGE FEATURES | | | VISUAL COMPATIBILITY | | OVERALL IMPACT |
|---|---|---|---|---|---|---|---|---|---|---|
| INDICATOR WEIGHTING | 360 | | | | 295 | | | 145 | | |
| | % Non-Industrial 2km | % Non-Industrial 2km - 5km | % Designated Non-Industrial 2km | % Designated Non-Industrial 2km - 5km | Average Heritage Value | Density of Structures | Historic Landscape | With Respect to Land Use | Intrusion on Traffic | |
| Sub-Indicator Weighting | 90 | 90 | 90 | 90 | 115 | 115 | 65 | 115 | 30 | |
| PI13N/LF4N | 0.090 | 0.090 | 0.090 | 0.089 | 0.112 | 0.115 | 0.044 | 0.115 | 0.030 | 0.775 |
| PI1N/LF4N | 0.090 | 0.090 | 0.090 | 0.089 | 0.115 | 0.109 | 0.044 | 0.095 | 0.025 | 0.747 |
| PI27E/LF1E | 0.090 | 0.086 | 0.069 | 0.081 | 0.095 | 0.094 | 0.021 | 0.038 | 0.020 | 0.594 |
| LF1E | 0.090 | 0.085 | 0.088 | 0.077 | 0.101 | 0.099 | 0.044 | 0.020 | 0.015 | 0.619 |
| LF3C | 0.090 | 0.090 | 0.090 | 0.090 | 0.104 | 0.099 | 0.065 | 0.058 | 0.005 | 0.691 |
| LF9C | 0.090 | 0.090 | 0.090 | 0.090 | 0.099 | 0.105 | 0.065 | 0.077 | 0.010 | 0.716 |

compatibility with land use (as with PI13N/LF4N), and with respect to heritage features and visual compatibility. In total, PI1N/LF4N is less impacted than PI13N/LF4N.

LF9C is the third most impacted siting option. LF9C, along with LF3C, is the most rural of all siting options. The land use is predominately agricultural with some wooded sections. A limited amount of rural residential development has occurred primarily along the major roads. The area has been almost exclusively agricultural since it was first settled.

LF9C is potentially most impacted in terms of land use compatibiliy (as with LF3C) and the third most impacted in terms of heritage features and visual compatibility.

The fourth most potentially impacted siting option is LF3C. As with LF9C, LF3C is the most rural of all the siting options. The area around LF3C is predominately agricultural with the exception of the rural residential development which has occurred in the Oswego Park subdivision to the south of the site. This siting option is potentially most impacted in terms of land use compatibility (same as LF9C) and fourth most impacted in terms of heritage features and visual compatibility.

LF1E is the second least impacted of the siting options. The area around LF1E is primarily rural. Among the farms and rural residences are some industrial uses. The potential impact on land use compatibility and heritage features is the second least for this siting option. LF1E is the least impacted in terms of visual compatibility.

The potentially least impacted siting option is PI27E/LF1E. The area around PI27E/LF1E is characterized by rural and agricultural uses in the south and industrial and undeveloped land in the north. A number of farms and rural residences are located in the area. Of all the options, the proposed OWMC facility is the most compatible with the existing and proposed land use surrounding PI27E/LF1E. The least potential impact in terms of heritage features and the second least impact in terms of visual compatibility were calculated for PI27E/LF1E.

Of particular concern with respect to community character as it relates to distinctive features, is the effect of facility siting on Niagara Falls and the resultant effects on image as it relates to tourism. Specific analyses of the tourism impacts of siting the OWMC facility in Niagara Falls, and in particular the relationship between the economic viability of tourism and image, were carried out by Laventhol and Horwath and J.B. Ellis Associates Ltd. This concern is not specifically addressed by the indicators that make up this factor but is dealt with in the following section on qualitative inputs to the analysis of siting options.

## 9.6.2 RANKING OF SITING OPTIONS - NUMERICAL ANALYSIS

Based on the numerical weightings the social factors were aggregated for an overall ranking of each siting option. Table 9.19 provides the impact values by factor. The impact values are added to arrive at the overall ranking of the siting options. The rank by factor is shown in Table 9.20.

With consideration given to all factors, LF3C is the potentially most impacted siting option. It is the potentially most impacted through disruption of the daily activities of residents adjacent to and in the vicinity of the access routes and disruption of community and recreation features in the site vicinity and adjacent to the access route. The impact on social cohesion is also the highest for LF3C. Lower levels of impact are projected for displacement of residents, disruption of residents in the site vicinity and community character.

The second potentially most impacted siting option is PI13N/LF4N. Potential disruption of residents adjacent to the site, disruption of community and recreation features adjacent to the site and in the access route vicinity and effects on community character are the greatest for this siting option. The potential for disruption of residents in the site vicinity and disruption of community and recreation features adjacent to the access route are the second highest for this option. Lower levels of impact are projected for the displacement of residents and disruption of the daily activities of residents adjacent to access routes, social stability and social cohesion.

PI1N/LF4N is the third potentially most impacted siting option. Disruption of residents in the site vicinity is highest for this siting option and disruption of residents adjacent to the site is second highest. The impacts are

### TABLE 9.19
### NUMERICAL ANALYSIS
### IMPACT BY SITING OPTION - OVERALL AND BY FACTOR

| | SITING OPTIONS | | | | | |
|---|---|---|---|---|---|---|
| FACTOR GROUPINGS/FACTORS | PI13N/ LF4N | PI1N/ LF4N | PI27E/ LF1E | LF1E | LF3C | LF9C |
| Impacts on Residents | | | | | | |
| Displacement | 0.707 | 0.709 | 1.138 | 1.102 | 0.595 | 0.301 |
| Disruption of Daily Activities | | | | | | |
| - Adjacent to Site | 1.500 | 1.302 | 0.618 | 0.394 | 1.029 | 0.732 |
| - Site Vicinity | 0.825 | 0.828 | 0.597 | 0.449 | 0.460 | 0.789 |
| - Adjacent to Access Route | 0.304 | 0.338 | 0.007 | 0.012 | 0.800 | 0.623 |
| - Access Route Vicinity | 0.160 | 0.149 | 0.012 | 0.012 | 0.600 | 0.534 |
| Impacts on Community and Recreation Features | | | | | | |
| Displacement* | (0.163) | (0.200) | - | - | - | - |
| Disruption of Operations | | | | | | |
| - Adjacent to Site | 0.125 | 0.063 | 0.125 | - | - | - |
| - Site Vicinity | 0.092 | 0.086 | 0.130 | 0.055 | 0.162 | 0.009 |
| - Adjacent to Access Route | 0.123 | 0.123 | 0.003 | 0.003 | 0.150 | 0.106 |
| - Access Route Vicinity | 0.099 | 0.090 | 0.006 | 0.006 | 0.090 | 0.068 |
| Community and Region | | | | | | |
| Social Stability | 0.490 | 0.482 | 0.718 | 0.696 | 0.647 | 0.608 |
| Social Cohesion | 0.223 | 0.141 | 0.302 | 0.301 | 0.328 | 0.062 |
| Community Character | 0.775 | 0.747 | 0.594 | 0.619 | 0.691 | 0.716 |
| OVERALL IMPACT | 5.423 | 5.058 | 4.250 | 3.649 | 5.552 | 4.548 |

* Values for the impact of displacement on community and recreation features are not included in the total for overall impact, since it is assumed that such effects will be mitigated.

## TABLE 9.20
## NUMERICAL ANALYSIS
## RANKING OF SITING OPTIONS - OVERALL AND BY FACTOR

| FACTOR GROUPINGS/FACTORS | SITING OPTIONS PI13N/ LF4N | PI1N/ LF4N | PI27E/ LF1E | LF1E | LF3C | LF9C |
|---|---|---|---|---|---|---|
| Impacts on Residents | | | | | | |
| Displacement | 3 | 4 | 6 | 5 | 2 | 1 |
| Disruption of Daily Activities | | | | | | |
| - Adjacent to Site | 6 | 5 | 2 | 1 | 4 | 3 |
| - Site Vicinity | 5 | 6 | 3 | 1 | 2 | 4 |
| - Adjacent to Access Route | 3 | 4 | 1 | 2 | 6 | 5 |
| - Access Route Vicinity | 4 | 3 | 2 | 2 | 6 | 5 |
| Impacts on Community and Recreation Features | | | | | | |
| Displacement | | Assumed Mitigation | | | | |
| Disruption of Operations | | | | | | |
| - Adjacent to Site | 6 | 5 | 6 | 4 | 4 | 4 |
| - Site Vicinity | 4 | 3 | 5 | 2 | 6 | 1 |
| - Adjacent to Access Route | 5 | 5 | 3 | 3 | 6 | 4 |
| - Access Route Vicinity | 6 | 5 | 3 | 3 | 5 | 4 |
| Community and Region | | | | | | |
| Social Stability | 2 | 1 | 6 | 5 | 4 | 3 |
| Social Cohesion | 3 | 2 | 5 | 4 | 6 | 1 |
| Community Character | 6 | 5 | 1 | 2 | 3 | 4 |
| OVERALL RANKING | 5 | 4 | 2 | 1 | 6 | 3 |

SCALE: 1 = Least Impacted
6 = Most Impacted

second highest for the factors community and recreation features adjacent to and in the vicinity of the access route, and community and recreation features adjacent to the site. Community character of PI1N/LF4N is also the second most impacted of all the siting options. Lower levels of impact are shown for disruption of residents adjacent to, and in the vicinity of the access routes, and community and recreation features in the site vicinity. This site option has the second lowest impact for social cohesion, and the lowest impact for social stability.

LF9C is the fourth most impacted siting option. LF9C has the second highest impact identified for disruption of residents adjacent to and in the vicinity of the access route, and is the third most impacted in terms of disruption of daily activities of residents in the vicinity of the site. More moderate impacts are identified for the disruption of daily activities of adjacent residents, disruption of operations of features adjacent to the site, along the access route and social stability. LF9C is the least impacted siting option in terms of displacement of residents, social cohesion and disruption of community and recreation features in the site vicinity.

PI27E/LF1E is the second least impacted siting option. This site is the most impacted in terms of displacement of residents, and has the highest potential impact on social stability and the disruption of community and recreation features adjacent to the site. It also has the lowest impact in terms of disruption of residents adjacent to the access route, features in the access route vicinity, and community character. This siting option shows relatively lower impacts in terms of disruption of residents adjacent to the site and in the site vicinity.

The potentially least impacted siting option is LF1E. LF1E is the second most impacted in terms of the displacement of residents and is the second most impacted in terms of social stability. Moderate levels of impact are identified for community and recreation features adjacent to the site, along the access route and social cohesion. LF1E is the second least impacted in terms of community character and disruption of residents adjacent to the access route. It has the lowest potential impact for disruption of residents adjacent to and in the vicinity of the siting option and for disruption of features in the access route vicinity.

### 9.6.3 ANALYSIS OF SITING OPTIONS - QUALITATIVE INPUT

Table 9.20 provides the ranking by factor and the overall ranking of the siting options based on the numerical weights.

However, the social analysis must consider impacts in a qualitative sense as well, and deal with some of the intangible dimensions of impact. These intangible dimensions refer to the perceptual and behavioural responses of the residents. Will people move away? Will they alter their behaviour in terms of how they use their property or community features? These are questions that can only be answered through monitoring and can only be predicted by inference from other projects. This qualitative input to the analysis is then, of necessity, based on professional judgement.

The factors contained in the factor groupings, impacts on residents and impacts on community and recreation fatures, have calculated impact values that we believe are a fair reflection of the magnitude of impacts across the siting options.

However, the factors in the factor grouping impacts on community and region, are less precise and less amenable to predication based on objective measures. These factors deal with many of the "special" impacts which are discussed in Chapter 1. The "special" impacts are those effects that result from a facility siting and which are influenced by decisions of individuals and organizations as well as the policy and management decisions of the facility proponent (OWMC) and the actions of regulatory agencies.

As noted in Chapter 1, there are no clear mechanisms for evaluating the impact on such factors as social stability, social cohesion and community character. Further, there are few directly comparable situations which permit us to evaluate these factors based on a range of experience. In effect, these factors will be best evaluated after several years of monitoring the actual response to facility siting and operation. Therefore, given the circumstances, it is necessary for us to rely on the limited information that is available with respect to people's behaviour in somewhat similar situations as well as our professional judgement as to what might occur in and around each of the siting options.

It should also be noted that although each factor is discussed separately below, they are linked and impinge upon each other.

## SOCIAL STABILITY

Although the two Niagara Falls sites have high degrees of social stability, and the stability of the local community (the 2km study area) will be impacted, the effect on the larger municipality should be minimal. This is because Niagara Falls is a large, diversified urban municipality with considerable familiarity and experience with heavy industry. Also, while the local area (2km study area) is a rural enclave within the larger municipality, it has been designated in part for transition to industrial use and so displacement of some residents and uses is anticipated in the normal course of events.

The Milton sites show considerably lower impacts on social stability. The fact that the area has undergone considerable change over past years has contributed to a less socially stable environment. The changes have been increased population resulting from growth spilling over from Toronto and Hamilton, new industrial development in Milton, and conversion of farmland to urban uses. More change is to be expected as demonstrated by the future scenarios analysis which is documented in Appendix F.

The social stability is also high at the two West Lincoln sites with LF9C having a stability index very close to those for the Niagara Falls sites. Both sites are agricultural with some scattered non-farm rural residential development. This is consistent with past trends and while there has been some population growth in the municipality over the past decade, the density of population in the site areas tends to be low. The introduction of a major industrial facility into a predominantly rural/agricultural area can have a substantial effect on stability because the changes it would bring will not necessarily be in tune with municipal objectives.

## SOCIAL COHESION

It is difficult to predict what ultimately will occur because of the uncertainty of the characteristics of individuals who may move in to replace those who move out as a result of facility siting, and the degree to which new households may locate in the community nearest the site.

*No significant impact on social cohesion from new households moving in as a result of employment creation is anticipated. This is because:*

- *the number of households expected to move in is not large*
- *proximity to work is not an important factor in selecting the place of residence*
- *the areal extent of Niagara Falls, Milton and West Lincoln provide many options for new households settling in without concentrating in one location.*

*However, what is uncertain are the implications of households moving in to replace those who voluntarily move out. Will people move in?*

*Given that Milton is a desirable residential area, and the general growth pattern in the regions around Toronto, there is little doubt that new households will move into the Milton area to replace anyone moving out. Given the slow growth rates and the current economic conditions, the same cannot be as confidently predicted for Niagara Falls and West Lincoln. The interaction and interdependence amongst people in these areas can be affected more dramatically. The implications for disruption of social cohesion may also be more extensive in a rural agricultural area if the magnitude of disruption is such that the provision of facilities and services is affected.*

*It is our view that the more stable and slower growing municipalities (West Lincoln and Niagara Falls) will be more impacted in terms of social cohesion than a community like Milton that is undergoing change resulting from population growth.*

## COMMUNITY CHARACTER

Of particular concern with respect to community character is the effect of facility siting on Niagara Falls and the resultant effects on image as it relates to tourism. Tourism sub-consultant, Laventhol and Horwath,[1] has concluded that, based on a series of linked assumptions, negative publicity resulting from the Environmental Assessment Board Hearing could lead to a tourism decrease in the order of 2 1/2% per year. The report notes that this figure is an estimate and the actual impact could be more or less than 2 1/2%. Of particular note, however, is the judgement that any decrease due to negative publicity resulting from the Hearing would be short-lived and would be recaptured by the third year following the Hearing because Niagara Falls is such a powerful tourist draw.

A study of parallel and comparable cases was carried out by J.B. Ellis and Associates.[2] This study found that there was no identifiable impact on tourism in Niagara Falls, New York as a result of the intense negative publicity about the states of emergency which arose from untreated hazardous wastes deposited in the Love Canal site. In another case, Ellis found that the presence of a major hazardous waste management facility, and the formal hearing which generated public opposition and related publicity when an incinerator was licensed to burn PCB's, did not affect attendance at a tourism facility drawing over one million visitors annually and situated less than 1.6 kilometres from the facility.

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1. Institute of Environmental Research Inc., Site Selection Process. Phase 4A: Selection of a Preferred Site(s), Social Analysis, Appendices. Volume 4 - Tourism Impacts, 1985.
2. Institute of Environment Research Inc., Site Selection Process. Phase 4A: Selection of a Preferred Site(s), Social Analysis Appendices Volume 5 - Comparative and Parallel Studies of Tourism Impact, 1985.

Given that:

- the comparables study does not identify any impact
- the Laventhol and Horwath projection of tourism decline is short-lived
- the Falls is an international attraction, and, with the ancillary attractions, will remain a powerful attractor of tourists
- the potential sites are about 5.5km (PI27E) and 8km (LF1E) from the Horseshoe Falls
- Niagara Falls and the Niagara Region are home to many heavy industries and have been so for a number of decades
- the PI27E site is designated for industry and is adjacent to industry,

it is concluded that any impact on image related to tourism will be minimal and short term.

Another aspect of the community character analysis is the introduction of a substantial heavy industrial facility into the midst of a rural agricultural community. Such a facility is incompatible with the image of a rural agricultural community which is characterized by a different environment, pace and lifestyles.

It is our view that the impact on community character in West Lincoln may be greater than at the other sites because of the dominance of agriculture and a farming lifestyle in West Lincoln. The intrusion of a heavy industrial activity would clearly change the image and character of the immediate surroundings and the municipality as well.

Because of the Niagara Escarpment viewpoints, this facility would have more visual impact in Milton than in the other municipalities. It would also affect the rural image at the PI13N site but because of the changing character of Milton in general the impact, while high, would not exceed that of the West Lincoln sites.

Given the diversity of Niagara Falls and the roles of heavy industry and tourism in its economic development, the facility should not have any effects on the image and character of the broader community.

While there will be impacts on social stability and social cohesion at all the sites, the uncertainty of the type and magnitude of impact prohibits us from modifying those rankings with any confidence.

In terms of community character, it is our judgement that the greatest potential change, will occur at the West Lincoln sites. With this in mind, we have assigned LF3C and LF9C a ranking of 6 (most impacted) for the community character factor (see Table 9.21).

When taking into account this qualitiative assessment, the site option ranking overall does not change but the gaps between the siting options are modified. It reinforces the preference from a social impact perspective for the Niagara Falls sites and demonstrates that the West Lincoln sites are less preferred.

### TABLE 9.21
### NUMERICAL ANALYSIS WITH QUALITATIVE ADJUSTMENT RANKING OF SITING OPTIONS - OVERALL AND BY FACTOR[1]

|  | SITING OPTIONS |  |  |  |  |  |
|---|---|---|---|---|---|---|
| FACTOR GROUPINGS/FACTORS | PI13N/ LF4N | PI1N/ LF4N | PI27E/ LF1E | LF1E | LF3C | LF9C |
| Impacts on Residents |  |  |  |  |  |  |
| Displacement | 3 | 4 | 6 | 5 | 2 | 1 |
| Disruption of Daily Activities |  |  |  |  |  |  |
| - Adjacent to Site | 6 | 5 | 2 | 1 | 4 | 3 |
| - Site Vicinity | 5 | 6 | 3 | 1 | 2 | 4 |
| - Adjacent to Access Route | 3 | 4 | 1 | 2 | 6 | 5 |
| - Access Route Vicinity | 4 | 3 | 2 | 2 | 6 | 5 |
| Impacts on Community and Recreation Features |  |  |  |  |  |  |
| Displacement |  | Assumed Mitigation |  |  |  |  |
| Disruption of Operations |  |  |  |  |  |  |
| - Adjacent to Site | 6 | 5 | 6 | 4 | 4 | 4 |
| - Site Vicinity | 4 | 3 | 5 | 2 | 6 | 1 |
| - Adjacent to Access Route | 5 | 5 | 3 | 3 | 6 | 4 |
| - Access Route Vicinity | 6 | 5 | 3 | 3 | 5 | 4 |
| Impacts on Community and Region |  |  |  |  |  |  |
| Social Stability | 2 | 1 | 6 | 5 | 4 | 3 |
| Social Cohesion | 3 | 2 | 5 | 4 | 6 | 1 |
| Community Character | 6 | 5 | 1 | 2 | 6 | 6 |
| OVERALL RANKING | 5 | 4 | 2 | 1 | 6 | 3 |

1. SCALE: 1 = Least Impacted
6 = Most Impacted

## 9.7 CONSTRUCTION IMPACTS

In addition to impacts considered with respect to site operations, construction impacts may be experienced by those residents and community and recreation features located around the sites and along the access routes. This section documents the potential social impacts associated with the facility construction and the implications for the ranking of the siting options.

Two types of potential social impacts are associated with the construction of the OWMC facility: nuisance impacts related to the construction activities and impacts arising from the influx of a temporary workforce.

The nuisance impacts include an expected increase in traffic for the duration of the construction period. The influx of workers on a daily basis, the movement of construction machinery and deliveries of materials to the site would contribute to the increased traffic. Dust, noise and vibrations are anticipated at the site during the full construction period. Increased noise along the access routes may also occur as a result of the increased traffic movement. No information is available concerning the extent of these nuisance impacts. Consequently, these nuisance impacts were not applied to each siting option to assist in their comparison.

However, it can be expected generally that those siting options with a greater number of residents and community and recreation features near the sites and along the access routes would experience greater disruption than those with fewer residents and features. Therefore, the nuisance impacts would be greatest for the Milton sites in terms of impacts on people and features adjacent to and in the vicinity of the sites, then the West Lincoln sites and least in the Niagara Falls sites. The impact on residents along the access routes would be greatest for the West Lincoln sites, followed by the Milton sites and least for the Niagara Falls sites.

In terms of community and recreation features adjacent to and in the access road vicinity, the impacts would be greatest for LF3C, then PI1N/LF4N followed by PI1N/LF4N and LF9C. The impact is least for the two Niagara Falls sites. Thus, when considering the nuisance effects related to construction activity, the impacts are consistently less for the Niagara Falls sites.

Owing to the location of the possible sites and the mobility of construction workers in Southern Ontario, it is assumed that a temporary workforce is unlikely to relocate in the vicinity of the site. Any impacts associated with the construction workers would not likely relate to the use of local community and recreation features, but rather to the use of facilities such as restaurants and gas stations. Any such economic impacts are addressed in the Clayton Research Economic Impact Report.[1] Potential social impacts arising from the influx of a temporary workforce were not considered to be of significance in the comparative assessment of the siting options.

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1. Clayton Research Associates Limited. Site Selection Process. Phase 4A: Selection of a Preferred Site(s), - Economic Base. 1985a.

## 9.8 MITIGATION

The analysis of the siting options was carried out assuming that no mitigation would be undertaken.[1] The potential impacts were reviewed to identify possible opportunities for mitigation, either for all sites or individual sites. Where mitigation opportunities were identified a sensitivity analysis was undertaken to assess the effect on the ranking of the siting options.

A number of mitigation measures were considered which addressed potential impacts. They are mitigation of community and recreation features on-site, noise mitigation at the source (i.e. for the incinerator and physical/chemical treatement plant), partial solidification technology based on effluent evaporation, the provision of rail access to the site and reduced site sizes for siting options LF1E and LF3C.

A mitigation policy of property protection for adjacent landowners was also investigated.

Each mitigation opportunity is discussed below.

### 9.8.1 DISPLACEMENT OF COMMUNITY AND RECREATION FEATURES

The community features located on PI1N/LF4N and PI13N/LF4N are historic buildings. No other siting options have community and recreation features located on-site. Possible mitigation measures range from integrating a historic building into the site facilities for use, to retention of the building on-site to recording and then demolishing the building. These measures are considered acceptable for most of the historic features located on PI13N/LF4N and PI1N/LF4N, however, all buildings that have been officially designated under The Ontario Heritage Act should be preserved and used on-site. It is assumed that an acceptable form of mitigation would be undertaken for these features. This has been assumed in Table 9.20, Ranking of the Siting Options. Without mitigation, PI27E/LF1E,LF1E, LF9C and LF3C are only slightly preferred over PI1N/LF4N and PI13N/LF4N, for this factor. The overall ranking of the siting options does not change.

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[1] With respect to the displacement of community and recreation features on-site, a commitment to mitigation was given by OWMC and the analysis of the siting options assumed that appropriate mitigation would be undertaken.

### 9.8.2 SITE RELATED NOISE IMPACTS

Mitigation of site operation noise was considered through plant design modification. Revised nighttime noise contours were calculated assuming design modifications to reduce sound levels by 5dBA[1] and applied to the sites to identify the number of residents and the community and recreation facilities which would be affected. This revised data was used in re-analysis of the siting options and is shown on Tables 9.22 and 9.23.

Assuming a 5dBA reduction in plant sound levels, no residents would be affected by nighttime noise for any siting option with the exception of PI27E/LF1E which would have seven residents (two households) within the 50dBA noise impact zone.

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[1] See M.M. Dillon Ltd., Site Selection Process. Phase 4A: Selection of a Preferred Site(s) - Transportation, 1985.

## TABLE 9.22
## FACTOR ANALYSIS WITH NOISE MITIGATION IMPACT VALUES BY SITING OPTION

| | SITING OPTIONS | | | | | |
|---|---|---|---|---|---|---|
| FACTORS | PI13N/ LF4N | PI1N/ LF4N | PI27E/ LF1E | LF1E | LF3C | LF9C |
| *Impacts on Residents* | | | | | | |
| Disruption of Daily Activities (Site Vicinity) | | | | | | |
| - without mitigation | 0.825 | 0.828 | 0.597 | 0.449 | 0.460 | 0.789 |
| - with mitigation | 0.765 | 0.678 | 0.676 | 0.408 | 0.460 | 0.699 |
| *Impacts on Community and Recreation Features* | | | | | | |
| Disruption of Operations (Site Vicinity) | | | | | | |
| - without mitigation | 0.092 | 0.086 | 0.130 | 0.055 | 0.162 | 0.009 |
| - with mitigation | 0.064 | 0.058 | 0.064 | 0.055 | 0.162 | 0.009 |

### TABLE 9.23
### FACTOR ANALYSIS WITH NOISE MITIGATION[1]
### RANKING OF SITING OPTIONS

|  | SITING OPTIONS |  |  |  |  |  |
|---|---|---|---|---|---|---|
| FACTORS | PI13N/ LF4N | PI1N/ LF4N | PI27E/ LF1E | LF1E | LF3C | LF9C |
| *Impacts on Residents* |  |  |  |  |  |  |
| Disruption of Daily Activities (Site Vicinity) |  |  |  |  |  |  |
| - without mitigation | 5 | 6 | 3 | 1 | 2 | 4 |
| - with mitigation | 6 | 4 | 3 | 1 | 2 | 5 |
| *Impacts on Community and Recreation Features* |  |  |  |  |  |  |
| Disruption of Operations (Site Vicinity) |  |  |  |  |  |  |
| - without mitigation | 4 | 3 | 5 | 2 | 6 | 1 |
| - with mitigation | 4 | 3 | 4 | 2 | 6 | 1 |

1. SCALE: 1 = Least Impacted
6 = Most Impacted

These changes to the number of residents affected by noise alters the ranking of the siting options for the factor, disruption of day-to-day activities and use and enjoyment of property, for residents in the site vicinity. PI13N/LF4N would become the most impacted siting option (second most impacted without mitigation); LF9C would become the second most impacted siting option (third most impacted without mitigation). PI1N/LF4N would be the third most impacted (most impacted without mitigation). PI27E/LF1E would remain as the fourth most impacted, LF3C as the second least impacted and LF1E as the least impacted siting option.

The community and recreation features within the noise impact zones of each of PI27E/LF1E, PI13N/LF4N and PI1N/LF4N (see Table 9.13) would not be affected by nighttime plant noise, assuming a 5dBA reduction in sound levels at the plant. The two community and recreation features identified on Table 9.13 as in the noise impact zone of LF3C would remain in the noise impact zone despite the assumed mitigation. The ranking of the siting options within the factor, disruption of operations (site vicinity) would change only to the extent that PI13N/LF4N would be the second most impacted siting option (same as PI27E/LF1E), rather than the third most impacted siting option.

While the assumed mitigation alters the rankings of the siting options within the factors, disruption of day-to-day activities and use and enjoyment of property (site vicinity), and disruption of operations (site vicinity), the changes do not alter the overall ranking of the siting options.

Further sound level attenuation measures may be possible. These measures will be considered when detailed site design is available and a preferred siting option is selected. The mitigation measures will be site specific and could take the form of facility or site design modifications, hours of operation restrictions, or sound attenuation measures applied to neighbouring properties.

### 9.8.3 PARTIAL SOLIDIFICATION

The analysis in this report assumes total solidification of the waste material. Partial solidification was investigated by the site selection team as a possible means of mitigating a number of impacts.[1] The most likely technology would be effluent evaporation at site. Partial solidification requires a lower volume of truck traffic[2] and as such could reduce the nuisance impact along the access routes. Noise impact zones along the access routes were revised to reflect the reduced truck volumes. Somewhat fewer residents are potentially affected by noise along each access route, assuming partial solidification. However, the change in number of residents does not alter the ranking of the siting options under the factor, disruption of day-to-day activities and the use and enjoyment of property.

While the evaporation technology on-site has some benefits in terms of reducing truck movements and hence the related noise and nuisance impacts, there are new impacts to consider.

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[1] For a discussion on the processes under partial and total solidification see, Monenco Limited, *Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Engineering*, 1985 and M.M. Dillon Ltd., *Transportation*, 1985.

[2] See M.M. Dillon Ltd., *Site Selection Process, Phase 4A: Selection of a Preferred Site(s), Transportation*, 1985.

First, an evaporation tower will be needed and so there could be some visual impact concerns. However, since this tower would be shorter than the incinerator stack, it was felt that the overall visual impact ranking of the sites will not change.

Second, under adverse weather conditions, the steam from the evaporation tower could result in some local icing and fogging conditions which may affect a limited area around the site, but in all probability be contained on-site. Further, it was noted that such adverse conditions are usually predictable and so the evaporation tower could be shut down to prevent icing and fogging.

Under these circumstances it was felt that the impacts, if any, would be least at the sites with the fewest adjacent residents (LF9C) and with the least traffic movements.

It was not felt that, on the information available, that any change in site option ranking is warranted.

### 9.8.4 RAIL ACCESS

Some siting options have the provision of rail access for the movement of additives and reagents as mitigation opportunities.

The particular benefits are the reduction of truck traffic and the related noise and nuisance impacts.

Additional impacts to consider are those related to construction of rail spur lines and the noise and nuisance impacts from the movement of trains.

In general terms, the impacts would be least for sites already possessing a rail line (PI27E/LF1E) or sites with a rail line adjacent (LF1E, LF3C).

Sites requiring the construction of a rail spur line (LF9C, PI13N/LF4N and PI1N/LF4N) would be more impacted.

Sufficient analysis has not been undertaken to determine how the provision of rail access would affect the overall ranking of siting options. However, in general terms, the provision of rail access reinforces the preference for the Niagara Falls sites (PI27E/LF1E and LF1E), with LF3C becoming more attractive relative to other sites. LF9C and the Milton sites (PI13N/LF4N and PI1N/LF4N) becoming less attractive.

The initial consideration of rail access favours the selection of PI27E/LF1E because no new impacts from use of the rail line would occur.

### 9.8.5 PROPERTY PROTECTION POLICY

It was suggested that the impacts on adjacent residents could be mitigated through a property value protection plan. This means that all adjacent property owners could sell to OWMC, under certain specified conditions.

For the purpose of this analysis we have assumed that all adjacent properties will be treated the same as on-site properties and individuals will have an opportunity to sell to OWMC. We have further assumed that everyone will exercise the option to sell and move. We know that this is not likely to be the case because experience with other major projects indicates many people who have the opportunity to move choose not to leave.[1] However, we have no way of distinguishing between those who would leave and who would not leave, so we have assumed all adjacent landowners will sell and move out of the area. We also assumed that no one else moves in to replace them. As noted in the discussion of social cohesion in Section 9.6.3 we are confident that new residents would move into the Milton area but less confident that the same would occur at the Niagara Falls and West Lincoln sites.

In testing this possible mitigation policy, there are some changes to our list of factors. The factor, disruption of residents adjacent to the site, is deleted and the data added to the factor displacement of residents; the factor disruption of operations of community and recreation features adjacent to the site is deleted and the data is added to the factor dealing with displacement of community and recreation features.

These adjustments also led to changes in the impact calculations for some other factors, notably social stability and social cohesion.

Table 9.24 shows the ranking for each site by factor. The qualitative adjustment to the community character factor is also included. The result is that the West Lincoln sites are shown to be more impacted relative to the other sites. LF3C remains as the most impacted site but the gap between LF3C

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1. Discussions with Ontario Hydro staff concerning the experience with the Bruce Nuclear Power Plant.

## TABLE 9.24
## ANALYSIS WITH QUALITATIVE ADJUSTMENTS AND ASSUMED ADJACENT PROPERTY PROTECTION AS MITIGATION RANKING OF SITING OPTIONS - OVERALL AND BY FACTOR[1]

| | SITING OPTIONS | | | | | |
|---|---|---|---|---|---|---|
| FACTOR GROUPINGS/FACTORS | PI13N/ LF4N | PI1N/ LF4N | PI27E/ LF1E | LF1E | LF3C | LF9C |
| **Impacts on Residents** | | | | | | |
| Displacement | 6 | 5 | 4 | 3 | 2 | 1 |
| Disruption of Daily Activities | | | | | | |
| - Site Vicinity | 6 | 5 | 3 | 1 | 2 | 4 |
| - Adjacent to Access Route | 3 | 4 | 1 | 2 | 6 | 5 |
| - Access Route Vicinity | 4 | 3 | 2 | 2 | 6 | 5 |
| **Impacts on Community and Recreation Features** | | | | | | |
| Displacement | | Assumed Mitigation | | | | |
| Disruption of Operations | | | | | | |
| - Site Vicinity | 4 | 3 | 5 | 2 | 6 | 1 |
| - Adjacent to Access Route | 5 | 5 | 3 | 3 | 6 | 4 |
| - Access Route Vicinity | 6 | 5 | 3 | 3 | 5 | 4 |
| **Impacts on Community and Region** | | | | | | |
| Social Stability | 2 | 1 | 4 | 3 | 5 | 6 |
| Social Cohesion | 5 | 4 | 3 | 2 | 6 | 1 |
| Community Character | 6 | 5 | 1 | 2 | 6 | 6 |
| OVERALL RANKING | 5 | 3 | 2 | 1 | 6 | 4 |

1. SCALE: 1 = Least Impacted
6 = Most Impacted

and PI13N/LF4N widens. LF9C moves up in rank to be the third most impacted with PI1N/LF4N now becoming the fourth most impacted (third most acceptable) siting option. This is because displacement of a greater proportion of a smaller population has implications for the stability and cohesion of the community. Even though LF3C and LF9C have smaller numbers of people actually displaced than the other sites, the implications for the social stability and social cohesion are greater.

This ranking of sites based on the mitigation policy of property value protection demonstrates the more fragile nature of the less diverse and less populated rural communities. It also reinforces the overall acceptability of the Niagara Falls sites and improves the acceptability of the Milton sites.

### 9.8.6 ALTERNATIVE SITE BOUNDARIES FOR LF3C AND LF1E

During the comparison of the siting options a question arose regarding the minimum site size requirements for LF3C and LF1E. A sensitivity test was undertaken for an alternative site boundary for each of these two sites to determine the effect, if any, on the overall ranking.

The LF3C alternative site boundary excludes the area east of Krick Road.[1] Reducing the size of LF3C in this way alters the overall ranking of this site. LF3C changes position with PI13N/LF4N to become the second most impacted siting option (from most impacted). However, LF3C is only slightly less impacted than PI13N/LF4N.

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1. This alternative site boundary was parcel option 1 which was compared in the site boundary refinement for LF3C, Chapter 4.

The alternative site boundary for LF1E excludes roughly the southeast half of the site. The overall ranking of LF1E does not change with this alternative site boundary.

## 9.9 BASIC ACCEPTABILITY

It was necessary in Phase 4A to reach an initial judgement on the basic social acceptability of the siting options. The issue of the basic social acceptability of the preferred site will be considered further in Phase 4B when OWMC's policies concerning compensation, mitigation and relationships with the local community are clarified.

To the best of our knowledge, there are no widely accepted standards which could be used to judge the basic social acceptability of impacts associated with facilities of this kind. Therefore, it is necessary for us to rely on our judgement, experience with other major projects and knowledge of similar kinds of facilities in other countries.

Throughout the site selection activities in Phase 3B of the project and the more detailed comparative evaluation of siting options in Phase 4A, a major objective has been to minimize the displacement and disruption of people and community features. Given that many factors are involved in the selection of the preferred site, we are confident that these social considerations have been appropriately dealt with and that displacement and disruption has been minimized. As noted above, we are not aware of recognized, accepted guidelines for basic social acceptability as it relates to these factors. It is clear, however, that with respect to displacement and disruption as they are discussed in this report the development of other major public projects have had more severe impacts. While application of the social factors suggest the facility siting will represent additional nuisances, such as noise, dust and odour, in most cases these nuisances are minimal and should not lead to radical changes in lifestyle or behaviour patterns with serious social implications.

Some factors considered in the social analysis, including our attempts to deal with what are the frequently less predictable impacts such as social stability, social cohesion and community character, were developed with the objective of selecting sites where impacts would be minimized. We are unaware of recognized, accepted guidelines that could be used to determine basic levels of acceptability for .these factors as well. Consequently, it is necessary to rely on experience elsewhere and professional judgement to assess the acceptability of potential impacts. In doing so, however, we recognize the need for on-going monitoring of social impacts and assume that OWMC will adopt appropriate mitigation and compensation strategies to address community concerns and impacts. These issues are discussed further in Chapter 10.

In summary, our preliminary analysis of basic acceptability, based on the information available in Phase 4A, concluded that all of the siting options were acceptable from the perspective of potential social impacts.

## 9.10 SUMMARY

Table 9.25 shows the various ranking of the siting options that have been determined.

Regardless of how one assesses and analyses the various siting options, they all have some social impacts. The costs and benefits or advantages and disadvantages vary from site to site and it becomes a matter of making choices and trade-offs.

The analysis and ranking of sites based on the numerical weights, highlights the trade-offs between the impacts on residents being greatest at the Milton sites and least at the Niagara Falls sites. This seems to be an anomaly because the greatest number of residents displaced are on the Niagara Falls sites. However, in the case of the Niagara Falls sites, the number of residents whose daily activities and use and enjoyment of property would be impacted is the least - both around the site and along the access routes. Further, there is the trade-off between the broader community and regional impacts which are lowest at the Milton sites and highest at LF3C and LF1E.

The ranking with the qualitative inputs makes some limited adjustment to the Community and Region factor grouping. In particular, this ranking gives more weight to the sites that are characterized by agriculture and rural development. Such sites are seen as being the most impacted in terms of community character and broader community and regional effects. It must be kept in mind, however, that the Community and Region factor grouping is

## TABLE 9.25
## RANKING OF SITING OPTIONS

| | NUMERICAL ANALYSIS | WITH QUALITATIVE ADJUSTMENTS | WITH ADJACENT PROPERTY PROTECTION AS MITIGATION |
|---|---|---|---|
| MOST IMPACT | LF3C | LF3C | LF3C |
| | PI13N/LF4N<br>PI1N/LF4N | PI13N/LF4N<br>PI1N/LF4N | PI13N/LF4N |
| | | | LF9C |
| | LF9C | LF9C | PI1N/LF4N |
| | PI27E/LF1E | PI27E/LF1E | PI27E/LF1E |
| LEAST IMPACT | LF1E | LF1E | LF1E |

affected by some of the special social impacts and there is little past experience to use as a reference base. What is central to making the necessary judgements is the diversity apparent in the potential site municipalities and the current or recent past experience with growth and change. Under these conditions, the Niagara Falls sites are in a municipality that is highly diverse, is home to a significant component of heavy industry, and has many other positive attributes so that the intrusion of a waste facility would not be as significant as it would in a smaller community or a single purpose community.

The Milton sites, while predominantly agricultural in nature, are located in a changing area that is experiencing considerable growth as a result of commuters from both Hamilton and Toronto and likewise it is an area with new industrial development within the community.

West Lincoln on the other hand possesses very little industry in the municipality and adjacent municipalities are by and large agricultural in nature as well. Because of the dominance of agriculture and a farming lifestyle in West Lincoln, the intrusion of a heavy industrial activity would have a relatively greater impact on the image and character of the immediate surroundings and the municipality as well.

This ranking does not alter the order of priority of the siting options but the gaps between them change. LF3C and LF9C are identified as more impacted and the relative acceptability of the Niagara Falls site is more pronounced.

The ranking of the sites based on the possible mitigation policy of property value protection for adjacent properties demonstrates the more fragile nature of the less populated rural communities.

LF3C is the most impacted, with PI13N/LF4N being second most impacted and LF9C third most impacted. The Milton siting option PI1N/LF4N becomes the third most acceptable site after the two Niagara Falls siting options. This ranking demonstrates the importance of OWMC corporate policies and mitigation measures to siting comparisons and acceptability.

In conclusion, the various ranks of the siting options demonstrate that the Niagara Falls sites are consistently the least impacted and therefore from a social impact perspective the most preferred. The West Lincoln siting option LF3C and PI13N/LF4N are the most impacted with LF9C and PI1N/LF4N sharing the middle range.

## CHAPTER 10

## ISSUES RELATED TO MONITORING, COMPENSATION AND MITIGATION

As noted in Chapter One, the social analysis for the OWMC project attempts to describe changes in relevant social characteristics of the community in response to the siting of the OWMC facility. As is apparent from the factors and indicators adopted for this study, some of the changes are readily quantifiable and can be predicted with certainty. The impacts of displacing residents or community and recreation features for site development are examples of these types of impacts. These might be termed standard impacts.

There are other changes in the social environment, however, that are more difficult to measure and can not be predicted with the same certainty.

These are changes that are rooted in the individual's behavioural and attitudinal response to the siting of the facility. These are special impacts. Special impacts are largely subjective in nature and related to the special concerns, perceptions and attitudes that community residents have concerning waste management facilities. While subjective in nature, special impacts are no less significant. However, the existing methodologies and models for predicting and measuring social impacts deal only with standard impacts. The "special" social impacts have seldom been analysed and so there are no existing, accepted methodologies to apply. Further, the "special" impacts are extremely difficult to predict.

Because there are no accepted mechanisms to predict "special" impacts, they must be predicted on the basis of existing conditions, available research and case studies which frequently are not directly comparable, and ultimately, professional judgement must be used. These limitations suggest that while a comparison of relative impacts at alternative sites can be undertaken with some certainty, much less confidence can be attached to predictions of the absolute magnitude of these impacts.

It is also apparent, based in part on the factors that were screened from this social analysis, that a number of community concerns based on perceptions of the facility have not been accounted for in the study. These concerns were shared by residents in the vicinity of all sites and consequently did not provide a useful basis for comparing siting options. These concerns, however, must be addressed if the potential impact of the facility is to be minimized. Whether or not these concerns will be adequately addressed will depend in large part on OWMC and the relationship it develops with the local community.

It is also apparent that the circumstances contributing to social change and consequently the potential impacts of siting the OWMC facility are not static. The actual social impact of siting the facility will continue to respond to a wide variety of developments locally, nationally and internationally. Of greater significance, however, is the recognition that OWMC will play a major role in future developments at the local level that will ultimately have a bearing on the social impact of the facility. In this regard, OWMC can be seen as the architect of its own social impact. The Corporation, through its activities as it develops and operates the facility, will in some part determine the magnitude of the social impacts experienced by the local community.

As noted earlier, significant social impacts associated with hazardous waste management facilities are rooted in attitudes and perceptions. It follows that actions which influence attitudes and perceptions will in part determine social impacts. OWMC's recognition of this and efforts to provide information and otherwise act in a manner that contributes to positive attitudes and perceptions of the facility is another way in which the Corporation can influence the actual social impact of the facility.

Given the uncertainty that surrounds the prediction of the "special" social impacts, the constantly changing social environment within which actual impacts will be realized, and the prominent future role OWMC can play in the social environment, the following conclusions can be drawn:

- a program is necessary to monitor the social impact of the OWMC facility in the host community

This report predicts probable social impacts associated with the development of the OWMC facility at various siting options as a basis for recommending the siting option where possible impacts are expected to be minimized. The report is not an actual forecast of future social conditions in the affected communities. Ongoing monitoring of relevant social conditions is an essential component of the social analysis. This study is therefore both an attempt to identify a siting option where future impacts might reasonably be expected to be minimized and to establish the framework for a social monitoring program. The baseline data assembled to prepare this report, and any other relevant indicators of social change, should be monitored to identify undesirable future development which can be responded to with impact mitigation strategies.

- a program should be in place to mitigate and compensate impacts that are predicted and those that may develop in the future

It follows that the monitoring program should be supported by an ability on OWMC's part to respond to changing social conditions.

- a program of public information should continue to be associated with OWMC activities in the local community during facility development and operation.

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